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Agriculture

Forest Service

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Northwest
Region

1997

Monitoring Report for the Land and Resource Management Plan

Wenatchee National Forest

Fiscal Year 1996

WENATCHEE NATIONAL FOREST

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June 30, 1997

Dear Forest User,

The Wenatchee Forest Plan establishes general direction of all resource management activities on the Forest. It provides for forest protection and coordinated multiple-use management of outdoor recreation, range, timber, watershed, wildlife and fish, minerals, and wilderness. The overall purpose is protection of ecosystem resources and providing for the sustained production of goods and services for the benefit of the American people.

Monitoring is a key part of Forest Plan implementation. This report summarizes and highlights Forest Service monitoring activities for Fiscal Year 1996 (October 1, 1995 through September 30, 1996). This is our seventh Monitoring Report.

As Wenatchee National Forest Supervisor, I am responsible for ensuring that all Forest management activities comply with the Forest Plan Standards and Guidelines and Management Area Prescriptions. The monitoring and evaluation program tells us how we are doing in implementing the promises made in the Plan. To keep you informed, I have prepared this annual Monitoring Report which describes progress made in implementing the Forest Plan as reflected by monitoring and evaluation.

The Wenatchee Forest Plan has been amended 12 times since its implementation in 1990 through the end of September, 1996. These amendments have kept the Forest Plan current and responsive to the changing needs of the American people. The Plan was substantially amended by the Northwest Forest Plan on April 13, 1994. Whenever the 'Forest Plan' is used in this document it refers to the Wenatchee Forest Plan and all amendments.

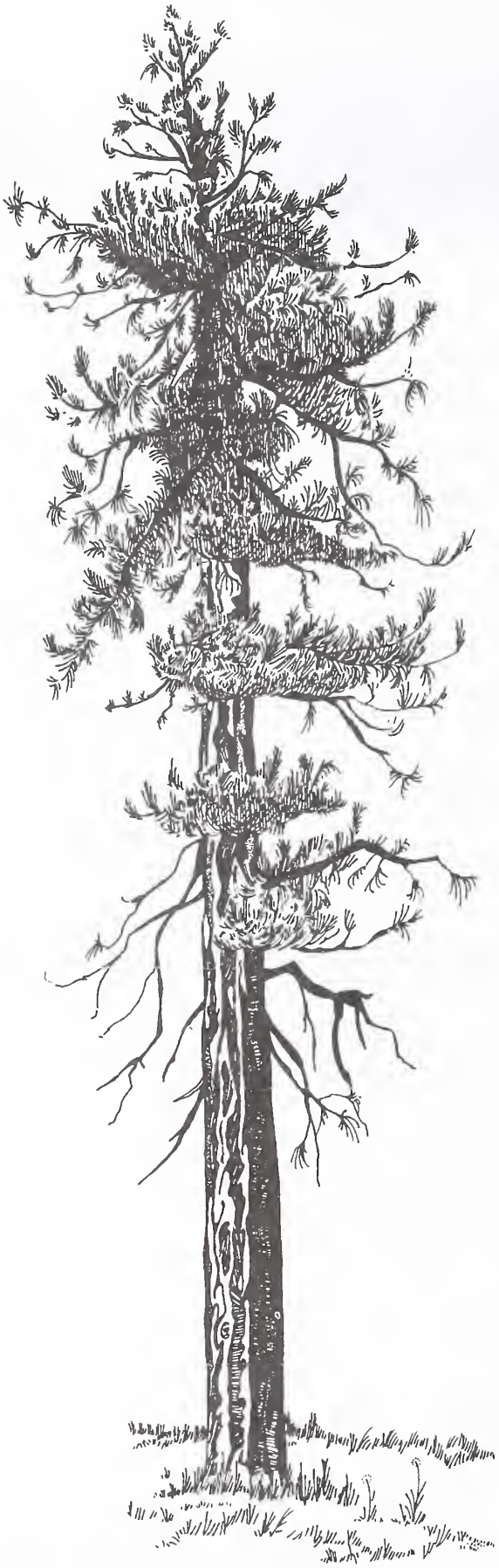
If you have any questions, concerns, or comments regarding the information in this report, the addresses and phone number of our Ranger Districts and Supervisor's Office are located inside the cover of this document. I hope you will continue to be involved with the management of your Wenatchee National Forest.

Sincerely,

Sonny J. O'Neal

Sonny J. O'Neal

Forest Supervisor



FISCAL YEAR
1996

MONITORING REPORT

LAND AND RESOURCE MANAGEMENT PLAN

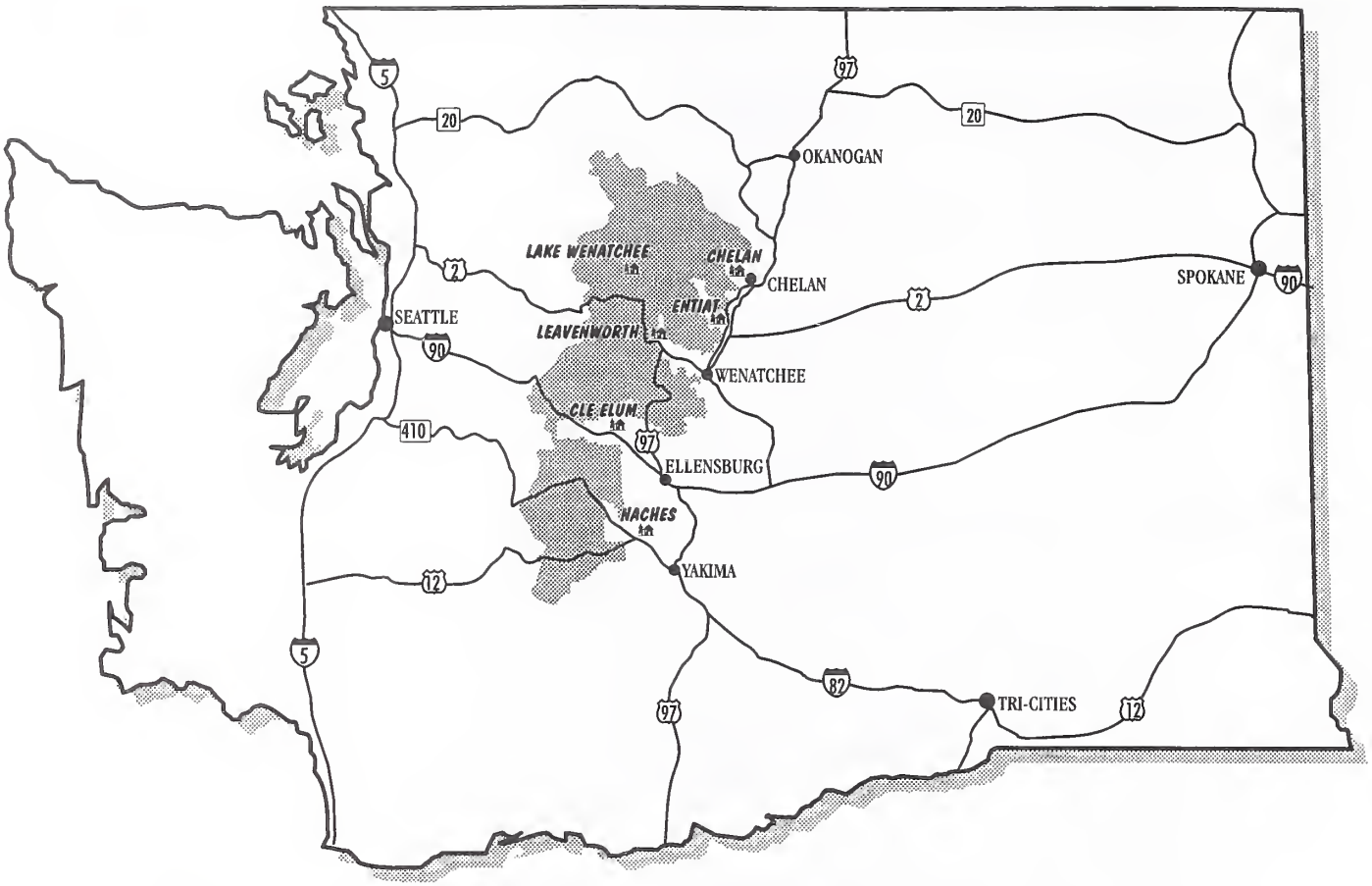
WENATCHEE NATIONAL FOREST

WASHINGTON

JUNE 1997

Contents

WENATCHEE NATIONAL FOREST



WASHINGTON

I. INTRODUCTION

PURPOSE OF THE MONITORING REPORT

The Wenatchee Forest Plan was implemented in 1990 after extensive analysis and public review and comment. The Plan was amended in 1994 by the Northwest Forest Plan. Preparation of the Forest Plan is required by the National Forest Management Act of 1976. It provides standards, guidelines, land allocations, and philosophy which serves as the basis for all Forest Service management on the 2.2 million acre Wenatchee National Forest (Wenatchee NF).

The purpose of this annual report is to provide information to the Regional Forester, Forest Leadership Team, and the public on how well the Forest Plan objectives are being met. The monitoring and evaluation process will provide information to determine if:

- laws, regulations, and policies are being following, including those found in the Forest Plan Management Area Prescriptions, and Forest-wide Standards and Guidelines, the Regional Guide, and Forest Service Handbooks.
- the management prescriptions are producing the predicted Goals and Objectives or Desired Future Conditions of the Forest environment.
- cost and annual budgets of implementing the Plan are within projected limits.
- the projected range of outputs is being produced; it will also evaluate effects.

A number of monitoring systems are already in place to comply with administrative and legal responsibilities. Forest Plan monitoring does not replace these systems, but rather complements them by addressing specific issues and concerns identified through the planning process.

GENERAL INFORMATION

Monitoring consists of gathering data, making observations, and collecting and disclosing information. Monitoring is also the means to determine how well objectives of the Plan are being met, and how appropriate the management Standards and Guidelines are for meeting the projected Forest outputs and protecting the environment. Monitoring is used to determine how well assumptions used in development of the Forest Plan reflect actual conditions.

Monitoring and evaluation may lead to changes in practices or provide a basis for adjustments, amendments, or Plan revisions. Monitoring is intended to keep the Forest Plan dynamic and responsive to change and new information.

II. SUMMARY OF THE RECOMMENDED ACTIONS

The following categories of actions are used to summarize those monitoring items needing attention from the Forest Supervisor and Forest Leadership Team. Group Leaders responsible for each monitoring item have recommended actions based on their evaluations (please refer to *Individual Monitoring Items*).

Results are Acceptable/Continue to Monitor

The results for these monitoring questions are either acceptable (within the 'Threshold of Variability' listed in Chapter V of the Forest Plan), or more than one or two years of data is needed to evaluate the results (continue to monitor). For some items, several years of data collection is necessary to evaluate the effectiveness or validity of the Plan. Studies are being initiated to provide the baseline data and inventories necessary to answer these questions.

Change Management Practices

The results for these monitoring questions exceed the 'Threshold of Variability' for a particular monitoring item question in Chapter IV. An evaluation of the situation indicates the need to change practices to comply with the Forest Plan.

Further Evaluation/Determine Action

The results for these monitoring questions may or may not exceed the 'Threshold of Variability'. Additional information is needed to better identify the cause of the concern and to determine future actions.

Propose Forest Plan Amendment

Areas where results are inconsistent with the Forest Plan objectives or the Forest Plan direction was not clear. The follow-up action requires either changing or clarifying the Forest Plan through the amendment process. Non-significant amendments can be made by the Forest Supervisor. Significant amendments require Regional Forester approval.

The following table summarizes follow-up actions needed for each Monitoring Question.

Summary Table

Monitoring Item	Results OK	Change Management	Further Evaluation	Forest Plan Amendment
Recreation Opportunity Spectrum			■	
Trails	■			
Developed Recreation	■			
Management of Dispersed Recreation Areas	■			
Wild, Scenic, and Recreation Rivers	■			
Scenery Management	■			
Wilderness		■		
Cultural Resources (Heritage Resources)	■			
Coordination of Forest Programs with Indian Tribes	■			
Sensitive Plants, Biodiversity, and Old Growth	■			
Old Growth and Mature Habitat Indicators	■			
Mountain Goat Habitat	■			
Deer and Elk Habitat	■			
Primary Cavity Excavators	■			
Riparian For Wildlife Indicators	■			
Bald Eagle Habitat	■			
Peregrine Falcon	■			
Grizzly Bear	■			
Gray Wolf	■			
Marbled Murrelet	■			
Bighorn Sheep	■			
Townsend's Big-Eared Bat	■			
Canadian Lynx	■			
Ferruginous Hawk		■		
Common Loon	■			
Harlequin Duck	■			
Red-Legged Frog and Western Pond Turtle	■			
Fisher	■			
Hawk and Owl Nest Sites	■			
Snails	■			
Timber Offered	■			
Timber Harvest Units	■			
Timber Harvest	■			
Silvicultural Practices	■			
Reforestation	■			
Lands Not Suitable for Timber Management	■			
Maintenance of Long-Term Soil Productivity			■	
Fish/Riparian Standards and Guidelines	■		■	
Effectiveness of Riparian Standards and Guidelines			■	
Fish Management Indicator Species (MIS) Populations	■		■	
Aquatic Habitat Objectives	■			
Aquatic Ecosystems	■		■	
Range Management-			■	
Road Management	■		■	
Insect and Disease	■		■	
Forest Fire Protection	■			
Use of Prescribed Fire	■			
Air Resource Management	■		■	
Mining Site Reclamation	■			
Mining Operating Plans	■			
Community Effects/Resource Budgets	■			
General Monitoring of Standards and Guidelines	■			

III. ACTIONS TAKEN ON 1995 RECOMMENDATIONS

This section briefly explains actions taken on last year's recommendations. For more detailed information on a specific activity please refer to *Individual Monitoring Items.*

RECREATION

Recreation Opportunity Spectrum

A major emphasis was the layout and marking of salvage sales to minimize the effects on the visual condition, recreation setting, and resource values in the burned areas. The fires had significantly changed the appearance of much of the burned areas, but with a great deal of care, the recreation setting and the ROS classes will not be changed for the long term.

Forest Trails

The largest effort in restoring trails impacted by fire suppression was on the Entiat Ranger District. Fire suppression funds were available for several projects that restored trails impacted by fire suppression action. Following the flooding of 1995, the Forest received significant funding to repair flood damaged trails. This necessitated a shift of emphasis in 1996. Several projects, mostly on the Naches Ranger District, will be carried over into 1997.

Management of Developed Recreation Facilities

The Forest added 14 campgrounds and two developed day use areas on the Naches Ranger District to the concession operation program in 1996. The Forest now has most of the large developed recreation sites, with the exception of campgrounds on the Entiat Ranger District, managed under concession permits. There were no significant opportunities to develop new partnerships.

Management of Dispersed Recreation Areas

The Forest has made limited progress in getting known impacted areas rehabilitated. The Forest was able to complete some work through the *Jobs in the Woods* program. Inventory work continued as the Forest gathered field data for watershed assessments.

WILD, SCENIC, AND RECREATIONAL RIVERS

Inventory of river corridors continued through the data gathering process for watershed assessments. There was one project in the Entiat River corridor that required preparation of a *Water Resource Project Analysis* (see page 11). That planning effort was completed, and the planned activity can be completed without detriment to the free-flowing characteristics of the River.

SCENERY MANAGEMENT

Last year's recommendations were implemented to maintain landscape character goals and scenic integrity along the three main viewsheds of Blewett Pass Highway 97, White Pass Highway 12, and Shady Pass. Scenic quality of these highways has been maintained, enhanced, or left alone.

WILDERNESS

The Eightmile/Windy Pass area of the Alpine Lakes Wilderness was added to the limited-entry permit system. This action will limit the number of people in an area of increasing ecological damage. The Forest was able to do additional campsite inventory only in selected areas, primarily due to the need to gather data for watershed analysis.

SENSITIVE PLANTS, BIODIVERSITY, AND OLD GROWTH

The Forest continued to monitor existing plots and standardize methodology. No additional monitoring strategies or plots were initiated.

The Forest continued to assess the rate of old growth forest retention; the retention rate is much higher than predicted in the 1990 Wenatchee Forest Plan.

WILDLIFE

More information is being gathered for monitoring every year for wildlife; due to the ongoing nature of many of the monitoring items, every year additional steps are taken to complete the action items identified in previous years' reports. Each year, the Forest learns more from research on how and what to monitor. Please see the *Wildlife* section and *Summary of Current Research Efforts* for more detailed information.

SOIL, WATER, AND FISHERIES

Maintenance of Long-Term Soil Productivity

During Fiscal Year 1996, all of the recommended actions addressing maintenance of long-term soil productivity were implemented. The Wenatchee National Forest *Ground Based Harvest Policy* incorporates all the actions identified in the Fiscal Year 1995 Monitoring Report.

Implementation monitoring has indicated that the *Ground Based Harvest Policy* has been used to plan current and future timber sales, and other ground based disturbance. All of the actions incorporated in the *Policy* will be identified as Recommended Actions for Fiscal Year 1996.

Water and Fisheries

Action was taken on essentially all of the monitoring recommendations made in the 1995 Monitoring Report; the only exception was the recommendation to include a .85 mm sieve in all sample processing.

RANGE MANAGEMENT

During Fiscal Year 1996, all of the recommended actions addressing range management were implemented. Administrative actions listed in the monitoring report were all used to maintain healthy rangelands. A number of grazing allotments and/or pastures have been in a period of rest to improve range condition.

Coordination is continuing with the WA Department of Fish and Wildlife to work on the current wildlife (elk)/livestock conflict on the Naches and Cle Elum Ranger Districts.

IV. INDIVIDUAL MONITORING ITEMS

A. RECREATION

Monitoring Item-

RECREATION OPPORTUNITY SPECTRUM (ROS)

The goal is to provide a well balanced array of recreation opportunities across the breadth of the Recreation Opportunity Spectrum (ROS) to meet the public demand for outdoor recreation. The monitoring question is:

Are Forest Management activities resulting in changes in ROS settings; and, do end results meet the experience levels expected in the Forest Plan?

The major activities on the Forest in 1996 that had the potential to affect ROS settings were the timber salvage sales following the 1994 wildfires. A major emphasis in the layout and marking of the sales was to retain enough snags and green trees, where possible, to minimize the effects of the fires. A range of resource values were considered in the planning effort, including the visual character of the burns and the recreation setting. In monitoring the results of the sales, the outcomes were as good as could be expected, given the intensity of the burning in many areas.

There were no other projects on the Forest that resulted in any affects to, or changes in, the ROS setting. The end results of management activities matched the experience levels expected in the Forest Plan.

Recommendations Include:

Further evaluation.

We need to continue monitoring the effects of the timber salvage program to determine if our objectives are met over a longer period of time. Hopefully, as snags fall and forest regeneration continues, a reasonable ROS setting will continue over time.

ROS class delineation will need to be monitored as we move into the dry site timber stand management and vegetative manipulation to reduce fuel build-up and reduce fire hazard.

Due to land allocation changes in the Northwest Forest Plan (land being classified in Late-Successional Reserve and Matrix), we will need make changes in the ROS Class delineation. This can be completed during the next Forest Plan revision.

Monitoring Item-

FOREST TRAILS

The goal is to manage trail use to provide recreation opportunities in a wide range of recreation settings, and in harmony with other resource management objectives. The monitoring questions are:

Are trails providing the variety of opportunities intended in the Forest Plan?

Are trails with mixed users (e.g. horse/hiker, hiker/ ORV) meeting the expectations for all intended users?

Again in FY 1996, our trail maintenance funds decreased. Over the past 3 years our trail maintenance budget has decreased about 40 percent. This decrease came at a time when the Forest had major floods in 1990 and 1995, extensive fires in 1994, and two heavy snow years back to back with many avalanches across trails and many downed trees.

The Forest was able to complete construction of 8 miles of new multiple use trail in the Devil's Gulch Sand Creek area. In this project, 3 miles of very poor condition trail were abandoned and trail loop opportunities were improved in an area where most of the use is motorized. The Forest Plan emphasized that we have no net loss of trail miles.

The Forest was able to do some maintenance on about 50 percent of the 2,916 mile trail system. Very little of this work would constitute the total maintenance job. Many of the miles were just logged out; in other cases we were able to do some drainage and tread work, short reroutes, and some repair of flood damage.

The Forest completed at least brief trail condition surveys on about 75 percent of the trail system. The results of the survey indicate trail conditions as follows:

- Trails are being degraded by heavy use with little drainage and tread work done.
- Forest resources are being impacted by trail users going around obstacles on the trails.
- Motorized trail users are going cross-country to avoid trail problems, and are creating user built trails.
- Hill climbs are being developed by motorized users.
- There is excessive trail braiding in travelways.
- Meadows are being damaged by off-trail horse use.

About 35 percent of our trail system is below minimum Forest Plan Standards. There appears to be a decrease in conflicts between trail users on multiple use trails, according to contacts made with about 2,400 trail users. Most users attribute this change to the presence of motorized Ranger patrols and education financed by the Washington State Interagency for Outdoor Recreation.

Recommendations Include:

Continue to place emphasis on obtaining more funds for trail maintenance. The Fee Demonstration "Trail Park" Program may help significantly with generation of funds for trail maintenance.

Continue emphasis on restoring trails impacted by the 1994 fires, and continue work on the trails damaged by flooding in 1995. There are several flood projects to complete in 1997.

Continue to seek grants and partnerships to expand the effectiveness of the funds available.

Monitoring Item-

MANAGEMENT OF DEVELOPED RECREATION FACILITIES

The goal is to provide safe, well maintained, developed recreation facilities for the public commensurate with recreation demand. The monitoring questions are:

Are available developed recreation facilities meeting public demand?

Are developed recreation sites, areas, and facilities being adequately maintained to serve the public and protect resource values?

Visitor use at developed recreation sites continues to be very high. Heaviest use occurs on weekends, nearly filling all sites. With sites consistently over-crowded, resource degradation results. Potential users are turned away increasing the pressure on dispersed sites. There is an excess of supply of developed sites during midweek, and during the early and late portions of the season. Visitor use was up from reduced levels of 1994 and 1995, which was lower due to the fires and flooding.

The backlog of recreation site heavy maintenance is still increasing. Protection of resources and improvements at developed sites is becoming increasingly more difficult due to budgetary constraints. Some improvement is occurring where sites are under concession management. In 1996, more sites were added into the concession program. Routine maintenance is completed by the concessionaires and the Forest is starting to gain on the backlog of work.

The Capital Investment Program funding is also decreasing. This program is a Federally funded means to reconstruct and rehabilitate worn out recreation facilities. The only project funded through this program was the reconstruction of campgrounds in the Highway 410 corridor on the Naches Ranger District.

In summary, the Forest is not able to meet demand for recreation capacity during high use periods, weekends and mid-summer. The Forest is not meeting public expectations for the quality of sites and facilities, or for protection of forest resource values. The campgrounds and facilities that best meet public expectations are concession operated sites.

Recommendations Include:

Continue to place developed recreation sites and areas under concession permits.

Place a greater emphasis on obtaining partnerships with other agencies and the private sector, to help obtain financial resources to maintain recreation sites and facilities to meet Forest Plan direction.

Implement a fee demonstration project involving developed recreation sites as a means to increase available budget to accomplish necessary facilities maintenance.

Monitor Naches District fee demonstration project on Rimrock Lake and South Fork of Tieton River.

Monitoring Item-

MANAGEMENT OF DISPERSED RECREATION AREAS

The goal is to provide opportunities for dispersed recreation activities where compatible with other resource management objectives. The monitoring questions are:

Are dispersed sites meeting public demand?

Is the Recreation Opportunity Spectrum providing the expected variety for Forest users?

Dispersed recreation activities continue to be a high percentage of the recreation use on the Forest. There is more than an adequate supply of dispersed sites and areas in the Roaded Recreation setting across the Forest. However, the highest demand is for camping spots adjacent to streams and lakes that are accessible by road. There is a significant shortage of low-impact, suitable camping spots in these areas. The increase in user developed roads in riparian areas is a continuing problem. As the Forest continues to gather data for watershed analyses more use areas are being discovered. Many of these areas are resulting in impacts to aquatic resources that do not meet the Standards and Guidelines of the Forest Plan.

Recommendations Include:

Relocate and rehabilitate dispersed recreation use areas in riparian areas through watershed rehabilitation projects and other project opportunities.

Continue to inventory and monitor dispersed recreation use and activities as funding allows.

B. WILD, SCENIC, AND RECREATIONAL RIVERS

Monitoring Item-

WILD, SCENIC, AND RECREATIONAL RIVERS

The goal is to retain the character and attributes of rivers recommended for Wild, Scenic, or Recreational designation. The monitoring question is:

Are resource management activities along recommended river corridors being conducted in a manner to provide protection at the appropriate level of classification?

There was one proposed project on the Forest in 1996 that had the potential to affect the classification determined in the Forest Plan for recommended rivers. This project was the proposed construction of a trail bridge across the Entiat River as part of the projects planned in the Upper Entiat Valley Analysis Area. A Water Resource Project Analysis (*Free Flow Analysis*) was completed for this bridge and an Environmental Analysis for the trail system changes is currently being written. The bridge was designed to span the stream from bedrock outcrop to bedrock outcrop, and would not affect the free flow characteristics of the stream. The bridge was also designed to be in concert with the visual and recreation setting objectives for a recreational segment of a Wild and Scenic River.

The Forest continued with the extensive stream survey and inventory efforts, and the completion of watershed assessments called for in the Forest Plan. These inventories have identified a significant amount of recreation use impacts in the streamside riparian areas. During the completion of watershed restoration projects, these impacts will be addressed and appropriate changes will be made in recreation use patterns to reduce or eliminate unacceptable impacts. None of these impacts are considered to be detrimental to the classification level of the rivers; however, they are impacts that need to be addressed to meet the Standards of the Forest Plan.

Recommendations Include:

Continue monitoring as scheduled.

Continue working on river inventories during the watershed analysis process, and implement restoration projects that will improve resource conditions on rivers recommended for designation.

Continue to monitor planned projects within, or adjacent to, river corridors.

C. SCENERY MANAGEMENT

Monitoring Item -

SCENIC RESOURCE OBJECTIVES

The objective is to manage vegetation and facilities to provide views that are consistent with the stated scenic quality objectives for each management area. The monitoring question is:

Do the cumulative effects of all resource activities within a viewshed meet the desired scenic condition?

Forest landscape architects reviewed the potential cumulative effects of resource activities on scenery. Field review of project areas was done along three major viewsheds.

Blewett Pass Highway 97, White Pass Highway 12, and Shady Pass viewsheds were selected for summary analysis. Scenic resource analysis on these viewsheds indicate that the viewsheds vary from natural appearing to an altered condition.

Blewett Pass viewshed is in a natural to slightly altered condition throughout most of the travel route, except for the altered condition between Blewett Pass and Bonanza Campground. A thinning project was done last year along the foreground to improve scenic quality. Color, textural, and line changes occurred while maintaining green trees throughout the immediate foreground and encouraging future large trees to grow along the roadside. Swauk discovery trail, located on top of Blewett Pass, provides opportunities for people to experience many Forest Service decisions designed to accommodate a variety of public uses and maintain the health of the Forest. Feedback from those who experienced the 3 mile walk expressed positive educational, recreational, and sensory experiences while using the self-guided interpretive trail.

White Pass viewshed is in a natural to slightly altered condition throughout the travel route. Vegetative changes throughout the travel route blend well with the natural diversity of landscapes from the Forest boundary to White Pass. The scenic qualities of this viewshed are maintained at a very high level. The White pass ski area completed a new quad lift line and removed the old number one lift line. The result was an appearance of less clutter, elimination of the lift line along the skyline, and a more efficient layout. The Texaco station adjacent to the White pass ski area improved their architectural motif to an alpine character theme, reduced clutter and enhanced information.

Shady Pass viewshed is in a slightly altered to altered condition. A portion of the viewshed was analyzed to find ways to improve the viewshed through rehabilitating past management practices, and from blown down trees. Last year, the blown down trees were removed, blending the area with adjacent natural appearing landscape patterns. A fuel reduction project along the foreground was also done by thinning young trees and reducing fuels and slash. The area was improved by some irregular spacing of young trees providing viewing into the stands. Another attraction along the

viewshed is the old lookout at Junior Point. Presently, the minimal safety devices in the area are utilitarian and needs aesthetic improvements. There is an opportunity to improve the area to an attractive sense of place and viewpoint enhancement.

Firebreak lines were re-created due to the catastrophic fire of 1994. The area of Chesapeake Saddle, towards Grouse Mountain, has been altered. The past strategy to reduce the visual impact by blending debris into the earth and rearrangement of materials was done to keep motorized use from creating new paths in the firebreak corridor. The vegetation is slowly recovering in the area.

Recommendations Include:

Continue monitoring as scheduled.

Blewett Pass Highway 97 Viewshed

To maintain scenic values, additional vegetative changes along the roadside from the top of Blewett Pass to Bonanza Campground should be kept to a minimum adjacent to areas of past vegetative treatments, except to ensure public safety in campgrounds and adjacent to Highway 97.

Continue working with the Department of Transportation and permittees to minimize signs, structures, and roadside improvements.

White Pass Viewshed

Continue to work with White Pass Ski Company to improve signs, landscaping, and color scheme.

Continue monitoring Highway 12 to maintain the highest possible scenic quality by designing all activities to retain naturally appearing scenery.

Continue to work in concert with Department of Transportation toward safety, and functionally and aesthetically pleasing structures in project planning.

Vegetation changes and structures along the Highway in the viewshed should continue to be monitored and enhanced to protect scenic qualities.

Shady Pass Viewshed

Maintain and enhance scenic quality while reducing fuels throughout the viewshed.

Continue to find alternative solutions for cut bank restoration to reduce visual contrast of roads.

Incorporate design arts into thinning projects to improve scenic quality.

Future vegetative management along the viewshed should be design to meet moderate to high scenic objectives. Varying stand densities, irregular spacing, clumping, creating a variety of spaces with contrasting variety and diversity of tree sizes will enhance scenic quality.

Monitoring Item -

STAND CHARACTER GOALS

The objective is to manage vegetation so that the stand character (species and structural mix) is moving in the direction specified for each Visual Quality Objective (VQO). The monitoring question is:

Are related Standards and Guidelines being implemented, and do they achieve stated goals and objectives, particularly scenic character goals?

The desired future condition for scenery is a multi-story stand composition, variety and diversity of large trees in groves, clumps, and/or scattered throughout the landscape. The high degree of naturalness is desirable.

In the last 6 years, more extended shelterwood-type cutting practices and partial cutting concepts have been initiated throughout the viewsheds. More recently, fire restoration and a few thinning projects to reduce fuels and promote healthy ecosystems have been initiated. This helps achieve a long-term forested environment with a more natural appearing landscape of scattered groups and individual large trees, and varying densities of vegetation patterns and a more open stand.

The trend of harvest practices in the last 6 years has been towards fewer openings (clearcutting) and heavily oriented towards partial cutting and thinning, where trees are left to achieve scenic quality goals.

Another goal is to reduce the amount of contrast in the viewshed. The trend is that the viewsheds are recovering to more naturally appearing landscapes. In addition, timber management has occurred on fewer acres since 1994, down from approximately 2,500 acres to approximately 1,200 acres annually in 1996. However, the fire restoration project from the 1994 fires treated approximately 13,500 acres.

An example of specific scenic goals to maintain and perpetuate large yellow bark ponderosa pines was monitored along the White Pass Highway 12 on the Hause Creek timber sale. Large clumps of trees were left and other trees thinned to make room for the existing large trees, and to allow small trees to become larger.

Recommendations Include:

Continue monitoring as scheduled.

D. WILDERNESS

Monitoring Item-

RECREATION IMPACTS ON WILDERNESS RESOURCES

The goal is to perpetuate wilderness character, natural ecological processes, and provide recreation opportunities appropriate in wilderness. The monitoring question is:

Is recreation visitor use or management resulting in changes in the physical, biological, or social settings that approach Limits of Acceptable Change (LAC) Standards specified in the Forest Plan?

In 1996 the forest received a budget equal to last year, but still far short of what is needed to maintain trails in wilderness and meet management and monitoring objectives. There were fewer Wilderness Rangers in the backcountry, increasing the work load on people who were able to be there. Due to the late duration of the snow pack, many of the areas scheduled to be inventoried for campsite condition were partly covered with snow until late July and even into early August.

The Forest was able to record campsite condition data in 17 areas in the Alpine Lakes Wilderness, primarily for completion of the Peshastin Creek Watershed Analysis. Of the 72 campsites inventoried in this watershed, 30 did not meet Alpine Lakes Plan Standards for vegetation loss, and also did not meet Forest Plan Standards for loss of down woody debris, due to heavy use for campfires. Encounters were monitored in the Ingall's Lake/ Headlight Basin area, and numbers of visitors exceeded Standards on weekends. Encounter numbers probably exceeded Standards in the Long's Pass/ Mt. Stuart area as well, based on user reports.

Detailed monitoring was completed in the Rachel, Lillian and Rampart Lakes area. After closing/eliminating one campsite, all campsites were within compliance with Standards. Encounter Standards are likely exceeded in this area on weekends.

The Eightmile/ Windy Pass area was added to the limited use permit area in 1996. The Ingall's Lake/ Mt. Stuart areas are proposed for inclusion into the permit area, and need to be added when the Snoqualmie Pass Area is added. This will be done as soon as budget priorities allow.

Forest wide, monitoring of Wilderness Standards and Guidelines were not extensive, but are limited by current budget for wilderness management.

Recommendations Include:

Continue monitoring as scheduled and Change Management where monitoring indicates Limits of Acceptable Change (LAC) Standards are not being met.

Continue to work toward a complete inventory of campsites, and increase follow-up data gathering, to provide a better understanding of the impacts of increasing use.

Take the appropriate management actions (as described in *Forest Plan Appendix E*, page E-26-28) to resolve the recreation impacts.

E. CULTURAL RESOURCES (HERITAGE RESOURCES)

Monitoring Item -

CULTURAL AND HISTORICAL SITE PROTECTION

The goal is to protect cultural and historical resources from vandalism, disturbance from project activities, and natural degradation. The monitoring questions are:

Are the National Register characteristics of unevaluated and significant cultural resource properties being protected?

Are all reasonably locatable cultural resources being discovered during project area reconnaissance?

For FY 1996, 23 proposed project areas were surveyed for the presence of cultural properties. A total of 19,758 acres were inventoried, which resulted in 20 cultural sites being recorded. This brings the Forest's total number of recorded cultural properties to 845. The largest projects related to two fire recovery projects remaining from the Tyee Fire, and three projects related to dry site strategy projects. The major components of these projects are timber harvest, tree thinning, and fuels reduction. The remainder of the projects were small scale recreation trails, trailheads, dispersed campsite rehabilitation, fishery improvements, summer home permits, and road relocation projects.

The majority of projects monitored (20 cultural sites) related either to fire recovery timber sales or to monitoring site conditions after the winter floods of 1995-96. The number of sites were fairly evenly split between fire recovery projects and sites affected by the floods. No new previously undiscovered sites were revealed by any project activities. All sites received adequate protection from project activities and their significant characteristics were not affected.

All standing historic structures eligible for, or listed in, the National Register of Historic Places have yearly maintenance reviews. These include all of the Forest's historic administrative buildings and lookouts, all of the picnic shelters within campgrounds, and a number of trail shelters constructed by the Civilian Conservation Corps (CCC) during the 1930s. Minor maintenance is undertaken yearly as needed on most of these structures. Such projects included roof replacement, new garage doors, and general upkeep at three sites.

Several cultural site evaluations were completed during FY 1996. These reports evaluate a site's eligibility for listing in the National Register of Historic Places. One historic and one prehistoric site were found to be eligible. Six historic and two prehistoric sites were determined ineligible.

In April 1996, the Lucerne Resort Passport in Time project took place. This project used the help of eight PIT volunteers over a period of 5 days to survey and map the historic features of the Lucerne area along the shoreline of Lake Chelan. Features were plotted using the Global Positioning System, which then was used to

create scaled maps of the site. These features related to the original attempts to build a railroad up Railroad Creek to the Holden Mine. Several building remains from the Lucerne Resort, and a few mining features.

During three weeks in August, 1996 the final season at the Swiftwaters Rock Shelters Passport in Time project occurred. This project used the help of 14 volunteers to excavate a small rock shelter located in one of the Forest's picnic areas. The site had been vandalized and looted for decades, yet surprisingly, much was left below the upper deposits. Excavation was concluded when the bottom levels hit an almost solid floor of roof rock fall. Since this may not represent the original floor of the rock shelter, there is the possibility of deeper, older cultural deposits. The earliest date obtained thus far from a fire hearth is about 2,900 years old. Two public tours of the excavation attracted more than 100 people. Besides explaining the methods and discoveries of the excavation, the tours emphasized the importance of protecting the area's cultural heritage.

Members of the Apple Valley Kiwanis Club and Forest Service employees worked together to restore and maintain the historic American Ridge Ski Lodge. Exterior painting, and small interior and exterior detail work helped to maintain the Lodge in good condition.

Other public outreach programs included community school classes, presentations at science fairs and community colleges, and participation in Washington State's Public Archeology Week. Signs for the Manastash Ridge off-road vehicle area which interpret the area's history will be ready for installation this summer. The brochure for the Chinook Pass Historic Auto Tour is expected to be printed soon.

The Forest continues its active cooperation with the Bureau of Reclamation (BOR) on projects located on adjacent lands. Work continues on the Bumping Lake Dam and the Kachess Lake Dam. Forest heritage personnel cooperated by monitoring project activities for the BOR. The Forest also continues its active membership in the Yakima Resource Management Cooperative by participating on the Archeological and Cultural Task Group. During FY 1996, heritage personnel worked with the Task Group to contract a survey of randomly selected 1/4 sections in the Taneum Canyon Quadrangle to test the validity of the Task Group's predictive model of archeological site location.

Recommendations Include:

Continued monitoring of active projects will ensure that cultural properties are protected from project activities. A review of all proposed projects should help in ensuring that potential effects on cultural properties are properly considered during planning stages.

The Forest is accumulating a growing number of site reports which have not been updated, nor the sites revisited, since they were first recorded; some more than 15 years ago. A selection of these sites needs to be revisited, and their conditions documented and updated to current Standards.

Monitoring Item -

CULTURAL AND HISTORICAL SITE REHABILITATION

The goal is to rehabilitate damaged sites eligible for inclusion in the National Register of Historic Places. The monitoring question is:

For sites eligible for inclusion in the National Register of Historic Places, is appropriate stabilization or rehabilitation of damage being completed?

During FY 1996, the contract work for the rehabilitation and stabilization of the Salmon La Sac Guard Station was completed. This two and one-half story log building was constructed in 1911. Work completed included a new underground drainage system to direct ground water away from the building, a new foundation, new sill logs on all sides, several new upright support logs, all new porch decking and guard rails (including front and back steps) and rechinking where needed. What remains to complete is a thorough cleaning job of the inside and painting the interior. Future public use of the building needs to be determined, although the possibilities are numerous; such as, an overnight rental cabin, an interpretive center for the Cle Elum valley, a concessionaire operated interpretive center/store, or a combination of these. The Forest was fortunate in obtaining the services of a highly skilled log building craftsman for this contract, as is shown by the exceptional quality of the finished work.

The Cle Elum District also worked with a volunteer group to restore the structural integrity of the Red Top Lookout. They replaced the catwalk decking and handrail, replaced the roof with new shingles, replaced most of the siding, installed new window shutters, removed all the windows, replaced the sills, refurbished the window frames, replaced the broken glass, and reglazed all the glass. The interior work is expected to continue in 1997.

The Naches District continued its annual program of rehabilitating and restoring the American Ridge Ski Lodge, a building constructed by the CCC in the 1930s. Volunteers are mostly CCC alumni that help out during a long weekend to replace and repair the broken elements of the building.

Several prehistoric sites located along the banks of the Wenatchee River again suffered severe erosion due to the floods of late November, 1995. These floods washed away several meters of bank and cultural deposits. The flood waters were higher this time than in 1990, but it appears that on the whole, less was lost to the

flood waters this year. Substantial funding would be needed to protect these sites from continued loss from such floods.

A CCC built picnic shelter/community kitchen is on the brink of being washed away by the American River. The floods of February 1996 brought the river closer to the edge of the shelter. Flood repair money was received to stabilize the river bank and/or direct the main force of the river back out into mid-stream. Work is expected to take place during the Summer of 1997.

The conditions of two picnic shelters was thoroughly examined in the Summer of 1996. The Crystal Springs Picnic Shelter and the Salmon La Sac Picnic Shelter both received detailed building condition assessments. The fireplace at Crystal Springs is unusable and is a potential hazard to the public, and the structure itself, if used. Conditions at Salmon La Sac were not quite as bad, although the building does lean. The Forest intends to begin stabilization and rehabilitation work at Crystal Springs during the Summer of 1997.

Recommendations Include:

Continue monitoring of those historic sites that are in danger of collapsing due to the lack of funding for proper maintenance.

Continue monitoring of those sites located along the Wenatchee River to try and determine the rate of loss of cultural deposits from frequent floods. Funding is currently lacking for resolving this problem. During FY 1997-1998, the Forest will be conducting a watershed analysis of the mainstem of the Wenatchee River. Protection of cultural properties along the bank of the river from flood erosion should be addressed in this analysis. A program of site stewardship should be implemented which could make use of volunteers to monitor site conditions and help the Forest track the severity of this problem.

Monitoring Item -

AMERICAN INDIANS AND THEIR CULTURE

The monitoring questions are:

For those trust resources identified in treaties with American Indians, what are their conditions and trends?

Are sites of religious and cultural heritage adequately protected?

Do American Indians have access to, and use of Forest species, resources, and places important for cultural, subsistence, or economic reasons, particularly those identified in treaties?

The 1855 Treaty signed with the confederated tribes and bands of the Yakama Indian Nation states in Article 3:

> "The exclusive right of taking fish in all the streams, where running through or bordering said reservations, is further secured to said confederated tribes and bands of Indians, as also the right of taking fish at all usual and accustomed places, in common with the citizens of the territory, and of erecting temporary buildings for curing them; together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land."

Please refer to the fisheries monitoring section for information on that trust resource.

Please refer to the heritage resources monitoring section for a discussion on the protection of cultural properties. Where known, or when notified by Tribal members, religious properties (or what are assumed to be religious properties by their nature) are protected through avoidance by project activities. The nature of such properties is kept confidential and is exempt from public disclosure. Since the Tribes may be reluctant to share information about the location of such sites those properties without overt evidence of such use may be inadvertently impacted by our lack of knowledge.

Both the Yakama Indian Nation and the Colville Confederated Tribes were notified of the excavations to be undertaken for the Swiftwater Rock Shelters under the Passport in Time program. Neither Tribe raised any concerns about the excavation. Members of the Yakama Cultural Committee have been active in responding to requests for comments and information about proposed projects on the Naches District and have a good working relation with the heritage personnel of that District.

Recommendations Include:

Continue monitoring as scheduled.

Continue communications with the Tribes on a government to government basis, with Forest and Tribal staff consulting during the planning stages on the specific aspects of those projects or resources of concern to the Tribe.

F. COORDINATION OF FOREST PROGRAMS WITH INDIAN TRIBES

Monitoring Item-

COORDINATION AND COMMUNICATION OF FOREST PROGRAMS WITH INDIAN TRIBES

The goal is to coordinate with appropriate Tribal representatives for all projects in which Indians may have concerns. The monitoring questions are:

Are American Indian rights being protected on National Forest lands?

Are projects with activities, or areas of concern to Indians, being coordinated with appropriate Tribal representatives?

Protection of Native American treaty rights is incorporated in Forest decision making. Consultation with Tribes that have an interest in management activities on the Forest is ongoing. The Memorandum of Understanding between the Yakama Indian Nation and the Forest Service continues to guide anadromous fish habitat management. Firefighter training was accomplished this year in cooperation with the Yakama Indian Nation.

Recommendations Include:

Continue cooperation and monitoring as scheduled.

G. SENSITIVE PLANTS, BIODIVERSITY, AND OLD GROWTH

Monitoring Item-

MAINTENANCE OF SENSITIVE PLANT POPULATIONS

The goal is to provide appropriate habitat to maintain viable populations or enhance populations of all threatened, endangered, and sensitive plant species. The monitoring question is:

Are sensitive plant species populations being maintained or increasing?

There are over 50 sensitive plants on the Wenatchee National Forest. All have limited distribution and some are in fairly inaccessible areas. One is a candidate for federal listing as threatened or endangered and five are species of concern.

All ground disturbing activities require biological evaluations for sensitive plants; this allows the effects on sensitive species to be determined, and essentially monitored on a project by project basis. The requirement to complete biological evaluations help assure that management activities do not result in viability threats to sensitive species.

Plot techniques can also be used to intensively monitor sensitive plants; the primary criteria to determine which species are monitored are: (1) rarity of the plant, (2) threats to the plant, (3) accessibility, and (4) funding.

Sometimes a proposed project has the potential to impact sensitive species; this provides an opportunity for monitoring effects of that activity on the plant. Intensive monitoring has generally focused on rarer plants and those that have significant threats. Consequently, plants that occur in areas where management activities commonly occur often receive more attention. Plants that grow in inaccessible areas may not be monitored due to lack of threats and the physical difficulty of reaching them. Funding is also an important consideration, for monitoring is an expensive endeavor. It is difficult to initiate or continue monitoring when funds are limited and vary from year to year.

The plants that have been monitored with plot techniques since 1990 are:

- Wenatchee Larkspur
- Thompson's clover
- Long-sepaled globemallow
- Clustered Lady's slipper
- Smoky Mtn Sedge
- Sierran cliffbrake
- Chelan rockmat
- Showy stickseed
- Pine broomrape
- Henderson's ricegrass
- Botrychium species
- Seely's silene

Some monitoring activities have used very formal plot techniques while others have been much more informal and anecdotal in nature. Most of the rarest sensitive species occur on the Leavenworth Ranger District; as a result, most formal monitoring has occurred on that District. For most of the species listed above, monitoring is still in progress. Henderson's ricegrass, Smoky Mtn. sedge, Botrychium species and Sierran cliffbrake all were sampled but monitoring was not continued, mainly because of personnel changes or the monitoring was short-term to determine the effects of a particular management activity.

On the Leavenworth and Entiat Ranger Districts in Fiscal Year 1996, morphological and general population trend data were collected on six different sensitive species: Delphinium viridescens, Cypripedium fasciculatum, Iliamna longisepala, Hackelia venusta, Petrophyton cinerascens, and Silene seelyi. Most of the data collected was a continuation of species' response to fire; fire response studies were initiated in 1995.

Population monitoring of Delphinium viridescens has been carried out since 1988. The Forest continued to collected density and morphological data at permanently established plots in Deer Park Springs and Camas Land areas. In addition, the Wenatchee National Forest collaborated with the WA Department of Natural Resources, Natural Areas Program to continue collecting morphological data in burned and non-burned sites. The purpose of the project is to determine how this

species responds to fire over a several year period.

A host of morphological, population structure, and density data was collected for Cypripedium fasciculatum, Iliamna longisepala, Petrophyton cinerascens, and Silene seelyi to determine how these species respond to fire. Again, the data collected was a follow-up from fire response projects initiated in 1995.

A number of monitoring projects have been carried out for Hackelia venusta. In Fiscal Year 1996, the Forest collected data on more than 20 morphological characters, in support of a taxonomic analysis of populations considered to be this species. In addition, monitoring continued on outplanted, micropropagated plants. This project is designed to determine relative success of three outplanted populations so that a more permanent population can be established. Data in 1996 was collected regarding survivorship, mortality, and population structure.

The Lake Wenatchee District also monitored Iliamna longisepa, Cypripedium fasciculatum and Silene seelyi. Cypripedium fasciculatum and Silene seelyi had formal monitoring established for population trend. Iliamna longisepa occurred in a proposed sale area, and the area was revisited to determine any effects to the plant from the sale boundary; boundaries were adjusted to avoid impacts.

A variety of sensitive plants have been monitored over the last 6 years. Valuable information has invariably appeared when monitoring has been consistently and carefully done. However, funding limitations and personnel changes have sometimes resulted in inconsistent monitoring.

Recommendations Include:

Continue to monitor existing plots and standardize methodology. Establish additional monitoring strategies and plots as funding allows.

Continue to monitor watershed analyses and National Environmental Policy Act documents for appropriateness of sensitive plant analysis.

Monitoring Item-

BIODIVERSITY and OLD GROWTH

The goal is to maintain native and desirable introduced or historic plant and animal species and communities. Provide all seral stages of all plant associations in a distribution and abundance to assure species diversity and viability. A desired future condition is to establish the local needs of management indicator species, rare species, and the proportion of seral stages that allows for natural diversity. The original questions proposed in the Wenatchee Land and Resource Management Plan are:

Is the trend of biological diversity moving as estimated?

Is the model for biological diversity being used on project and sub-drainage evaluations?

These questions were based on the premise that a diversity model would be developed and that predictions of biological diversity could be estimated. This has proven to be difficult, and consequently, the monitoring questions are inappropriate. However, the Northwest Forest Plan was later completed which provided some evaluation questions. They are:

Is the Forest ecosystem functioning as a productive and sustainable ecological unit?

Is the use of prescribed fire or fire suppression maintaining the natural processes of the Forest ecosystem?

Are desired habitat conditions for the northern spotted owl and the marbled murrelet maintained where adequate, and restored where inadequate?

Are habitat conditions for late-successional forest associated species maintained where adequate, and restored where inadequate?

Are desired habitat conditions for at-risk fish stocks maintained where adequate, and restored where inadequate?

Is a functional interacting, late-successional ecosystem maintained where adequate, and restored where inadequate?

Did silvicultural treatments benefit the creation and maintenance of late-successional conditions?

Will the overall conditions of the watersheds and provinces continue to be productive over the long term?

Biodiversity is essentially the variety of life and the processes that link them together and allow them to function; therefore, the amounts, kinds, and distribution of sensitive plants, old growth and noxious weeds all affect biological diversity. Monitoring of fire effects and fire recovery also relate to biological diversity.

Fourteen Watershed Analysis documents were completed in Fiscal Years 1995 and 1996. All of them addressed biodiversity and/or the components including old growth, sensitive plants and noxious weeds; these attributes are critical components of biological diversity. Weeds affect biological diversity by excluding native plants. Old growth ecosystems and sensitive plants are often limited in extent, and can significantly impact biological diversity by changes in their extent. Landscape vegetation is also an indirect assessment of biological diversity.

The Entiat Ranger District qualitative monitoring of *Burned Area Emergency Rehabilitation* measures were continued as part of normal field activities. Other fire-related monitoring included long-term vegetation transects, evaluation of the

rehabilitation seeding, evaluation of channel and hillslope structures and long term photo-point establishment. Riparian vegetation monitoring that was begun in 1994 was also continued.

The Leavenworth RD initiated a long-term study in 1996 to study the effects of ecosystem restoration projects, primarily thinning, and the resulting landscape on both understory and overstory species. This project was developed in conjunction with the District Wildlife Biologist who is collecting data on small mammals and birds in response to the same project. Twenty-four permanent plots were established in 12 study stands throughout the lower portion of Mission Creek. Within these plots, data was collected on species composition and cover, tree and snag density, and fuel loading. Four of the 12 study stands are to remain untreated as controls, four will receive a standard thinning treatment used elsewhere in the project area, and four will receive a thinning treatment to result in low density. The plots are to be sampled over an indefinite period to study the changes in species composition, cover, and tree and snag density.

Noxious Weeds

No formal monitoring of noxious weeds occurred in 1996. However, the Forest has been keeping field notes on population size of some non-natives planted near and, in some areas, on the Wenatchee National Forest. Examples include the Boundary Butte area following the 1994 fire, the Prince Creek Area where Common Crupina is a problem, and Clemens Mountain where Dalmation toadflax is established. The Leavenworth RD also keeps general notes on species and density of weeds at trailheads. Entiat Ranger District personnel again attempted to find the reported yellow starthistle in Navarre Coulee but it was not found.

Additionally, as part of the Forest-wide Noxious Weed Environmental Assessment (currently being written), the Forest evaluated a variety of sites for potential weed control. This essentially served as a monitoring of the status of weeds on each District. Over 12,000 acres are targeted for weed control on the Forest.

Old Growth Ecosystems

See also the wildlife section for the discussion on old growth habitat. In the 1990 Wenatchee Land and Resource Management Plan, there was estimated to be about 319,000 acres of old growth on the Forest. At the end of the first decade it was predicted that 307,300 acres would remain. This came off of a suitable base acres of about 630,000. Under the Northwest Forest Plan, only about 209,000 acres is considered suitable. It is very unlikely that the 11,500 acres of old growth predicted for harvest in 1990 will actually be harvested in the near future. In fact, ingrowth will likely grow old growth faster than the harvest rate. This is particularly true when only about 35 percent of the original suitable acres is available for harvest. Probably the biggest threat to old growth forests at this time is catastrophic fire.

In 1996, most of the approximately 13,600 harvested acres were salvage sales that included few green trees. Consequently, few acres of any old growth would have been harvested.

Recommendations Include:

Address biodiversity through the monitoring of appropriate attributes in watershed analyses and National Environmental Policy Act documents.

H. WILDLIFE

Management Indicator Species Habitat

Management Indicator Species are plant or animals species whose population characteristics can be used to evaluate the effects of land and resource management practices on the habitats they use.

Monitoring Item -

OLD GROWTH AND MATURE HABITAT

INDICATORS: spotted owl, pileated woodpecker, marten and northern three-toed woodpecker.

The goal of the indicator species program is to provide habitat to maintain viable populations of all old growth and mature habitat vertebrate species on the Forest. The monitoring are:

Are Forest Plan allocated sites being maintained?

Are established sites being used by indicator species?

NORTHERN SPOTTED OWL

Most spotted owl sites were monitored by the National Council for Air and Stream Improvement (NACSI) (267,000 acres) for research purposes, or by the Forest (31,500 acres) for, project implementation in 1996 (*1996 Wildlife, Fish, Rare Plant Report).* The number of young produced from all nests was high but this was a smaller percentage of the young produced in Washington State than in 1995.

All projects with any effects to threatened and endangered species must meet the Endangered Species Act; this requires federal agencies to review actions authorized, funded, or carried out by them to ensure such actions do not jeopardize the continued existence of listed species. All but a few projects that affected spotted owl habitat have been through this screen. In 1996, 1,208 acres of spotted owl habitat were degraded and 182 acres were eliminated (*Scafidi, C.* Sept. 1996, USFWS). One structure was completed and 3,100 acres of habitat were restored or enhanced (*1996 Wildlife, Fish, Rare Plant Report*).

In 1996, Eric Forsman presented his research on spotted owls which covered the last 5 years of data gathering. He found that 1992, 1994, 1996 produce higher numbers of spotted owl young than 1991, 1993, 1995. The Wenatchee National Forest has the highest reproductive rate in high and low years of the eight study sites in Oregon and Washington studied. There is no information to explain the regular ups and downs of reproduction or why the Wenatchee area would have significantly higher reproduction than other areas.

Forsman analyzed pellets collected from the study areas to determine what was eaten by spotted owls. There was no significant differences in prey eaten on the Wenatchee National Forest than in other study areas. This study did not identify availability or amounts of prey that could affect reproduction.

Researchers looked at reproduction data in 1996 for each study area and over the range to determine if populations were replacing themselves. The models showed that populations were not reproducing enough young to replace the population. Some scientists did not agree with these findings, based upon modeling assumptions and that adequate data might not yet be available to make these determinations.

Washington Department of Natural Resources (DNR) and Plum Creek Timber Company completed Habitat Conservation plans for their lands intermingled with the Wenatchee National Forest. The DNR Plan will maintain habitat in ways that will not affect any pairs or habitat being maintained on the Wenatchee National Forest. The Plum Creek Plan will eliminate habitat on intermingled lands and reduce the potential and likelihood that owl pairs will be maintained by the Forest.

The Forest continued the Snoqualmie Pass AMA plan in 1996, which is addressing one of the two major potential connectivity barriers on Forest between Late-Successional Reserves (LSRs). This plan shows the need to acquire lands from Plum Creek, in key areas, to maintain connectivity.

The Forest completed the *Late Successional Reserve Plan* for the Forest and some individual Late-Successional Reserve plans. The remaining individual LSR and MLSA plans are planned for completion in 1997.

The Forest has developed a *dry site strategy*; this strategy focuses on decreasing the susceptibility of fire to dry habitat while maintaining resource values. Spotted owl pairs and Late-Successional Reserves are one of the resource values within the dry site habitat. Some dry site plans began in 1996 and could be implemented in 1997. These plans will affect the potential for future spotted owl habitat both by helping protect them from fire and potentially creating habitat faster. It is not known if any reductions of habitat will occur. During the *dry site strategy* implementation the need to monitor habitat for spotted owls will need to be more specific.

Spotted Owl Information

Fiscal Year	Pairs	Resident Singles	Other Singles	Fledged Owls	Owls Banded	Owls/ Radio Transmitter
1989	55	NA	72	NA	50	0
1990	116	6	81	NA	200	18
1991	146	24	60	98	95	29
1992	164	20	67	207	215	74
1993	174	26	69	38	58	16
1994	181	6	46	128	182	45
1995	141	9	44	74	150	46
1996	141	9	48	83	90	15

The banding and inventory work by NACSI has completed 7 years of data gathering and is planned to continue into 1997. Pacific Northwest Research Station (PNW) is continuing research in the Cle Elum area using radio telemetry equipment in 1996 and into 1997. This information will help the Forest to better understand and manage for spotted owls.

Recommendations Include:

Continue monitoring as scheduled.

Begin to track old growth and mature habitat to provide for all wildlife species. Track habitat by dry, mesic mixed, moist, high elevation, riparian dry and wet riparian groupings.

The *Late Successional Reserve Plan* identified acres of habitat per owl pair within and without LSRs along with a monitoring plan. For 1997, reporting the reproductivity of owl pairs, acres of habitat per pair and the acres of suitable habitat degraded or eliminated during the year will be part of the Forest Monitoring Report. This data will show if the acres allocated to sites are being maintained, and if established sites are being used by spotted owls.

PILEATED WOODPECKER, NORTHERN THREE-TOED WOODPECKER AND MARTEN

Spotted owls, pileated woodpeckers, northern three-toed woodpecker, and marten are all indicators for mature and old growth habitat and are affected by changes in this habitat.

Pileated Woodpecker Information

Fiscal Year	Estimated Population	Acres Inventoried	Acres Improved	Structural Improvements
1990	380	0	0	0
1991	380	100	25	20
1992	380	7,300	0	0
1993	380	1,800	110	0
1994	380	400	227	197*
1995	380	700	664	107*
1996	380	0	0	50

* Trees that were either fully or partially girdled in the live crown to create snags.

Populations estimates are from models based on insufficient information, therefore trends are shown as no change. Actual populations are unknown. Some inventory and improvement of habitat work is being done.

Northern Three Toed Woodpecker Information

Fiscal Year	Estimated Population	Acres Inventoried	Acres Improved	Structural Improvements
1990	UNKNOWN	0	0	0
1991	UNKNOWN	20	0	0
1992	800-1200	3,100	0	0
1993	800-1200	1,100	40	0
1994	800-1200	1,000	227	220
1995	900-1300	3,600	664	124
1996	900-1300	200	100	20

Populations estimates are from models based on insufficient information, therefore trends are shown as no change. Actual populations are unknown. Some inventory and improvement of habitat work is being done.

The ecosystem recovery projects for the 1994 fires plan to leave sufficient snags, when available, to meet the needs of cavity excavator species. This should be beneficial to the Northern Three Toed Woodpecker. The fires have created additional habitat for the three toed woodpecker so populations are expected to increase in the next 5 to10 years.

Pine Marten Information

Fiscal Year	Estimated Population	Acres Inventoried	Acres Improved	Structural Improvements
1990	1200	0	0	0
1991	1200	1,100	0	0
1992	1200	5,600	0	30
1993	1200	1,300	100	3
1994	1200	2,600	0	7
1995	1200	21,922	0	66
1996	1200	6,000	0	0

Populations estimates are from models based on insufficient information, therefore trends are shown as no change. Actual population information is shown and analyzed somewhat in second table for marten. From these tables it can be determined that the Forests knowledge about this species is increasing yearly and cumulatively.

Fiscal Year 1996 is the first year for the following table of data and analysis. All survey data for this species are not included in this table but will be available next year. Further analysis of this data is needed.

A General Observation (GOBS) is one made by anyone at anytime that is reported. Reliability of GOBS is often questionable; but for marten indications are that they are present, and some observations take place in most years.

The number of stations where a survey was completed looking for marten are called Survey Station. This data is reliable as to the number of animals seen and, depending on further analysis, may show distribution of marten or/and be the beginnings of data that may indicate population trends or range expansion. The following data does indicate presence of marten on the Forest or a distribution on all Districts.

Pine Marten Observations

Year	General Observations	# Marten Reported	# Survey Stations	# Marten Located
Pre 1989	33	38	0	0
1990	14	14	33	9
1991	8	12	65	7
1992	5	5	0	0
1993	7	7	6	2
1994	4	4	8	0
1995	3	3	67	12
1996	0	0	23	2

The effects of the 1994 fires may never be analyzed for species other than the spotted owl.

Recommendations Include:

Continue monitoring and Further Evaluation.

The following should be the monitoring questions for mature and old growth indicator species. The areas being maintained for old growth and mature species have changed since 1989 (from OG-1 and OG-2 to LSRs and MLSAs).

a. Are populations being maintained as predicted?

b. Is habitat capability (quality and quantity) and distribution being maintained as predicted?

c. Is there connectivity between areas being managed for old growth and mature habitat.

Monitoring Item-

MOUNTAIN GOAT HABITAT

The goal is to maintain or increase populations and to provide animals for recreational enjoyment. The concern is to maintain or increase sub-populations. The monitoring questions are:

Are Forest Plan allocated sites being maintained?

Are established sites being used by indicator species?

There are 14 areas with mountain goat populations within the Wenatchee National Forest. Habitat quality and mountain goat populations are decreasing in the areas located on the north end of the Forest. The areas on the south end of the Forest have had declining habitat and populations since the 1960s. These trends

have been documented by the Washington Department of Fish and Wildlife in inventories of mountain goat populations. In 1996, the Forest began to retrieve inventory data from WA Department of Fish and Wildlife and file in the WILDOBS database, so trends can be determined for sub-populations. From this information the severity of the downward trend can be determined. This analysis should lead to some projects for habitat improvements that may begin reversing the downward habitat quality and population trends.

Mountain Goat Information

Fiscal Year	Estimated Population	Acres Inventoried	Acres Improved	Structures Improved
1990	1600	0	0	0
1991	1600	5,000	0	0
1992	1600	2,550	150	0
1993	1600	36,650	150	100
1994	1600	12,000	0	0
1995	<1600	8,050	0	100
1996	<1600	19,000	0	0

Fiscal Year 1996 is the first year for the following table of data and analysis. All survey data for this species are not included in this table, the GOBS data and monitoring survey data are not separated but additional data and survey data will be separated sometime in the future. Further analysis of this data is needed.

A General Observation (GOBS) is one made by anyone at anytime that is reported. Reliability of GOBS is often questionable; at present the only interpretation of this data can be that these species are present on Forest.

The number of stations where a survey was completed looking for marten are called Survey Station. This data is reliable as to the number of animals seen.

Mountain Goat Observations

Year	General Observations	# Mountain Goats Reported	# Survey Stations	# Mtn. Goats Located
Pre-1989	55	many	0	0
1990	4	17	0	0
1991	2	5	0	0
1992	2	24	8	8
1993	2	3	0	0
1994	16	100	50	119
1995	3	14	33	77
1996	3	3	32	118

Recommendations Include:

Continue monitoring as scheduled.

Analyze existing data to determine needs for management of mountain goats.

Monitoring Item-

DEER AND ELK HABITAT (BIG GAME INDICATOR SPECIES)

The goal is to maintain habitat capability to support populations identified in the Forest Plan and provide animals for recreation enjoyment. The monitoring questions are:

Are populations being maintained as predicted?

Is habitat capability being maintained?

The Watershed Assessments continue to indicate that elk use of forage in meadows is exceeding Forest Plan Standards. High amounts of rain late into the spring provided a higher level of forage and increased production of calves this year. It appears that forage available on the Forest is less than can carry the existing numbers of elk. This has been brought to the attention of WA Department of Fish and Wildlife, and their 1996 elk plan shows the goal is to maintain the elk herd numbers for this area.

Deer numbers have decreased in reaction to the 1994 fires which burned significant portions of winter range. Buck to doe ratios have increased on the northern part of the Forest (from four bucks/100 does to eight to nine bucks/100 does) the last 2 years, likely as a result of no general hunting seasons during the deer migration. The new levels of bucks per 100 does meets the objectives for buck numbers.

There were 445 acres of improvements, five structures plus 20,000 acres of inventory work done this year on deer and elk. Deer surveys on the burned winter range were completed in 1995 and in 1996 in cooperation with the WA Department of Fish and Wildlife. This will help the Forest determine where the deer are wintering, and future population trends.

White-tailed deer and moose sightings are being tracked as these two species appear to be increasing.

Recommendations Include:

Continue monitoring as scheduled.

Monitor deer and elk use of winter ranges.

Coordinate more closely with the WDFW on maintaining healthy deer and elk herds. May agree on some additional desired future conditions and ways to get to those conditions.

Develop a plan for management of deer and elk.

Enter into projects to improve elk use of the Forest with the Washington Department of Fish and Wildlife, Yakama Indian Nation, Rocky Mountain Elk Foundation and others. Agree on monitoring items and implement monitoring to see if project meet their objectives.

Monitoring Item-

PRIMARY CAVITY EXCAVATORS
(Indicator Species for dead and defective trees)

The goal is to provide habitat to maintain viable populations. Maintain number, size and distribution of trees and snags to meet habitat capability objectives by management area. The monitoring questions are:

Are primary cavity excavator habitat and replacement trees being left in the proper numbers, sizes and distribution?

Is the habitat being utilized as expected?

Are down trees being provided?

Primary Cavity Excavator Information

Fiscal Year	Estimated Habitat	Acres Inventoried	Acres Improved	Structural Improvements
1990	1,550,000	NC	0	0
1991	1,550,000	720	0	236
1992	1,550,000	13,262	147	63
1993	1,550,000	2,400	2,950	154
1994	<1,550,000	2,300	217	251
1995	<1,550,000	5,770	644	220
1996	<1,550,000	2,000	290	95

In 1996 the new Forest guidelines were implemented, tested, and found to be sound. The PNW lab completed a report on longevity of snags. It established that certain species of trees stand longer after fires than others, and provided good information for management.

Primary cavity excavator habitat needs to be better defined and information collected on a landscape level to determine trends. Every acre provides some primary cavity excavator habitat (1 to 100 percent of potential). Even though the Forest meets the Guidelines, the trend of snags and primary cavity excavators has not been determined for the Forest, a watershed, or drainage. Late-Successional Reserve, Adaptive Management Areas, and Watershed Analyses used the new Snag Guidelines.

Recommendations Include:

Continue monitoring as scheduled.

Compete a Primary Cavity Excavator Habitat Conservation Plan that identifies how to monitor trend of populations and habitat.

Enter surveys into a database and complete analysis for monitoring.

Proposed, Endangered And Threatened Species

The goal is to manage key habitat to improve status of threatened or endangered species to a point where they no longer need protection under the Endangered Species Act.

Endangered and threatened wildlife species found on the Forest are the bald eagle, peregrine falcon, grizzly bear, gray wolf, northern spotted owl and marbled murrelet. All reported sightings of threatened and endangered species were documented and, except for the spotted owl, all sightings known have been entered in WILDOBS. The entering of information into the database has made information more accessible and more frequently used in assessments.

The spotted owl has been discussed in the *Indicator Species* section of this report.

Monitoring Item-

BALD EAGLE HABITAT (threatened species)

Monitoring questions include:

Are existing nest sites producing young as anticipated?

Are nest, roost and perch sites being maintained?

Bald Eagle Information

Fiscal Year	Potential Nest Sites	Existing Nest Sites	Young Produced	Acres Inventoried	Acres Improved
1989	1	1	1	NC	0
1990	34	2	2	NC	0
1991	34	2	2	1,800	0
1992	34	3	2	1,000	0
1993	34	4	4	2,650	160
1994	34	4	6	1,400	0
1995	34	4	7	2,445	0
1996	34	5	3	1,000	2,625

Data is available back to 1985.

The number of active nests is slowly and steadily increasing. The number of young and the number of nest sites have not reached recovery goals for the Forest. If habitat improvements for riparian habitat and fish populations continue there is potential to achieve recovery goals in 5 to 10 years.

Recommendations Include:

Continue monitoring as scheduled.

Continue to expand work on eagles to achieve recovery goals.

Inventory and maintain roost and perch sites.

Develop site management plans for active bald eagle sites.

Begin using surveys to document eagle habitat and population trends.

Monitoring Item-

PEREGRINE FALCONS (endangered species)

Monitoring questions include:

Are recovery sites being maintained?

Are sites occupied?

Peregrine Falcon Information

Fiscal Year	Number Released	Potential Nest Sites	Existing Nest Sites	Young Produced	Acres Inventoried	Acres Improved
1988	0	unknown	0	0	0	0
1989	5	80	0	0	5,000	1
1990	5	80	0	0	500	0
1991	11	80	0	0	500	1
1992	6	80	1	3	1,000	0
1993	5	80	1	2	1,000	0
1994	5	81	2	5	1,500	0
1995	0	82	2	5	2,000	0
1996	0	75	2 (10)	4	13,300	300

Helicopter surveys located ten additional nests on cliffs that were not present 10 years ago. Ground verification is needed to determine species and reproduction of these sites; the species using these nests are not known, but are likely peregrine falcons, prairie falcons or ravens.

Since only half the Forest was surveyed in 1996, the 1997 surveys may discover even more nest sites. The Forest has achieved and exceeded the recovery goal of one active nest site.

New data on potential sites were entered into GIS and WILDOBS databases in 1996. Upon completion of the 1997 surveys, the potential sites will be entered into GIS for further project assessments.

Recommendations Include:

Continue to monitor potential and active nest sites.

Prepare site management plans for known nest sites.

Monitoring Item-

GRIZZLY BEAR (threatened species)

The monitoring question is:

Are Guidelines for the North Cascade Grizzly Bear Recovery Area being implemented as they become established?

Grizzly Bear Information

Fiscal Year	Potential Den Sites	Existing Den Sites	Young Produced	Acres Inventoried	Acres Improved	Structures Improved
1994	UNKNOWN	U	0	1,000	117	5
1995	UNKNOWN	U	0	500	114	5
1996	UNKNOWN	U	0	3,520	1,675	6

The Grizzly Bear Recovery Plan is close to completion.

Recommendations Include:

A decision on finalizing the recovery plan is needed; then, the Forest can organize and begin planning for implementation.

Monitoring Item-

GRAY WOLF (endangered species)

The monitoring question is:

Is habitat capability on an increasing trend?

Fiscal Year 1996 is the first year for the following table of data and analysis. All survey data for this species are not included in this table but will be available next year. Further analysis of this data is needed.

A General Observation (GOBS) is one made by anyone at anytime that is reported. Reliability of GOBS is often questionable; at present the only interpretation of this data can be that it possibly indicates wolves are present.

The number of stations where a survey was completed looking for wolves is called Survey Station. This data is reliable as to the number of animals heard and their presence.

Gray Wolf Observations

Fiscal Year	General Observations	# Wolves Reported	# Survey Stations	# Wolves Located
Pre 1989	53	73	0	0
1990	23	31	0	0
1991	36	51	128	8
1992	49	62	64	3
1993	30	36	56	0
1994	10	11	92	3
1995	16	25	10	0
1996	3	0	2	0

Ungulate populations are generally on a downward trend due to decreased forage quality and increases in human activities both on and off the Forest (including highways and homes in the forest). Late-Successional Reserve and Adaptive Management Area planned management may decrease the potential for big game forage but may increase security cover by closing roads and providing for cover connectivity. This decreasing habitat trend has been identified for elk and forage in watershed analysis on the South end of the Forest.

The Forest has developed a *dry site strategy*. This strategy is to decrease the susceptibility of fire to the dry habitat while maintaining resource values. Wolf habitat would likely be enhanced by decreasing tree competition and renewal of forage for big game by prescribed fire. Dry site plans began in 1996 and likely will be implemented in 1997. These plans have the potential to increase habitat for big game.

All projects with any effects on threatened and endangered species must meet the Endangered Species Act. This act requires all federal agencies to review actions authorized, funded, or carried out by them to insure such actions do not jeopardize the continued existence of listed species.

Populations of wolves are likely not fully utilizing the prey or security cover available. Five structures were completed and 71,000 acres inventoried for gray wolves in 1994. Five structures were completed and 17,200 acres inventoried for gray wolves in 1995; two responses from wolves were heard. Six structures were completed and 118,570 acres inventoried for gray wolves in 1996; 775 acres of habitat was restored or enhanced in 1996 (*1996 Wildlife, Fish, Rare Plant Report*). Inventory information is being entered into WILDOBS database in 1997, and should be available for analysis next year. The trend of wolves is likely an increasing population even though the prey is thought to be decreasing.

Recommendations Include:

Continue monitoring as scheduled.

Inventory to locate dens and verify wolf use on the Forest.

Develop a recovery plan for this area.

Analyze monitoring surveys. Prepare long term monitoring plans and maps of survey routes and wolf sightings.

Monitoring Item-

MARBLED MURRELET (threatened species)

Monitoring question.

Are populations and habitat being maintained?

Fiscal Year 1996 is the first year for the following table of data and analysis. All survey data for this species are not included in this table but will available be as soon as priorities allow. Further analysis of this data is needed.

A General Observation (GOBS) is one made by anyone at anytime that is reported. Reliability of GOBS is often questionable. This species is secretive and not in high numbers anywhere; therefore, GOBS sightings are unlikely to occur often.

Surveys are the most likely way of detecting this species. So far surveys have not located this species on Forest but only a small part of the habitat has been surveyed; fifty acres were surveyed for marbled murrelet in 1996. No new sightings of murrelet were found on the Forest. Surveys will continue in future years.

Marbled Murrelet Observations

Year	General Observations	# Marbled Murrelet Reported	# Survey Station	# Marbled Murrelet Located
Pre-1989	0	0	0	0
1990	0	0	0	0
1991	0	0	0	0
1992	0	0	0	0
1993	0	0	0	0
1994	1	1	26	0
1995	0	0	25	0
1996	0	0	5	0

Some potential marbled murrelet habitat was removed by logging after surveys that met Regional protocol determined no murrelets were using the habitat. No occupied marbled murrlet habitat has been decreased in amount or value. The trend of potential habitat is downward, but the populations as best we know are being maintained, even though they are extremely low.

Recommendations Include:

Continue to monitor projects within the range of the species.

Monitoring Item-

HABITAT AND SPECIES IDENTIFIED AS CANDIDATES FOR THREATENED STATUS (sensitive species)

Monitoring question:

Is habitat capability on an increasing trend?

Candidate species and sensitive species are not the same list. The candidate list is a United States Fish and Wildlife Service (USFWS) list and the sensitive list is the Forest Service list. The sensitive species list has not been officially updated since 1989 in the Region, and 1990 for the Forest when the list was identified in the Forest Plan.

BIGHORN SHEEP

Habitat is increasing from the 1988 and 1994 fires. Populations are stagnated because of the small number of animals available to provide genetic viability. Animals are being relocated from healthy herds within the State by the Washington Department of Fish and Wildlife to supplement the herds within and near the Wenatchee National Forest.

A study between the Forest and WA Department of Fish and Wildlife was completed and a report is available. The WA Department of Fish and Wildlife has completed a plan for the State; potential habitat has been identified.

Recommendations Include:

Continue the study with WA Department of Fish and Wildlife. A coordinated plan between the Forest and WA Department of Fish and Wildlife is needed to determine where and what changes are needed to manage for this species. Within this plan potential conflicts between the domestic sheep in range allotments and bighorn sheep use overlap need to be resolved.

Prepare a plan for the area from the Wenatchee River North to the Okanogan National Forest. Identify the areas and numbers of animals to be maintained.

Enter survey data into WILDOBS and complete an analysis of data to answer monitoring questions.

TOWNSEND'S BIG EARED BAT

Habitat is being maintained through implementation of the Boulder Cave Management Plan which has provided winter use restrictions and limited the access of human visitors.

The habitat and populations in Boulder Cave are being monitored and appear to be about the same as in 1996. Additional work is planned to find out if reproduction that occurred in historic times can be reestablished.

In 1995, two ANABATs (records sounds bats make) were purchased for a cooperative bat use project, which inventoried 160 acres in cooperation with WA Department of Fish and Wildlife, Boise Cascade Corporation and Washington State University. This project should lead to monitoring protocols and experience to carry out those protocols. In 1996, a program was purchased to identify species of bats from Anabat recordings. Projects have been established to survey tunnels, caves and bridges. All bat sighting were entered into the WILDOBS database. Ten structures were established to attract Big Eared Bats.

Recommendations Include:

Continue monitoring as scheduled.

Locate and protect the reproductive site or sites for the Boulder Cave population.

Inventory habitat and species to determine their range.

CANADIAN LYNX

Fiscal Year 1996 is the first year for the following table of data and analysis. All survey data for this species are not included in this table, but will be available next year. Further analysis of this data is needed.

The surveys appear to show a decline in lynx detection; further monitoring and analysis are needed to determine trend.

Lynx Observations

Year	General Observations	# Lynx Reported	# Survey Stations	# Lynx Located
Pre-1989	11	11	0	0
1990	0	0	0	0
1991	3	3	0	0
1992	2	2	0	0
1993	0	0	34	2
1994	0	0	85	7
1995	0	0	116	4
1996	0	0	129	0

A cooperative management guide has been completed and should be published in 1997; cooperators involved included timber companies, private individuals, National Forests and WA Department of Fish and Wildlife.

In 1996, track and camera surveys were completed on about 9,000 acres. All lynx sightings and monitoring surveys were entered into WILDOBS, and a analysis of data prepared for the 1997 report. There were about 1,500 acres of restored or enhanced habitat and three structures created for denning (*1996 Wildlife, Fish, Rare Plant Report*).

Recommendations Include:

Continue monitoring as scheduled.

Surveys are needed through out lynx habitat to determine if populations are present and their condition. Report sightings of these species and load into WILDOBS database.

Develop a map of habitat by quantity and quality so trends can be determined.

CALIFORNIA WOLVERINE

Fiscal Year 1996 is the first year for the following table of data and analysis. Further analysis of this data is needed. More data may be available, but has not been located at this time.

A General Observation (GOBS) is one made by anyone at anytime that is reported. Reliability of GOBS is often questionable; at present the only interpretation of this data can be that wolverine are likely present, but in low numbers.

The number of stations where a survey was completed looking for wolves is called Survey Station. Due to low populations, inaccessibility of habitat, and other

management priorities surveys have only been done a couple of years and in limited number.

Wolverine Observations

Year	General Observations	# Wolverine Reported	# Survey Stations	# Wolverine Located
Pre 1989	16	16	0	0
1990	0	0	0	0
1991	1	1	0	0
1992	1	1	0	0
1993	1	1	0	0
1994	0	0	0	0
1995	3	3	6	1
1996	0	0	23	0

Habitat was likely stable for 1996, but population trends have not been determined. Populations are small (probably five to 20 animals).

Six structures were completed to enhance wolverine habitat, and 6,000 acres surveyed for wolverine. The structures were road closures; this should make more habitat available for wolverine use, with lowered potential for conflicts with humans.

Maps of potential denning habitat were developed using wolverine study data from Idaho.

Recommendations Include:

Continue monitoring as scheduled.

Surveys are needed throughout Wolverine habitat to determine if populations are present and their condition.

FERRUGINOUS HAWK

Habitat is being maintained. There are very few sightings of ferruginous hawks on Forest. Reproduction is probably not occurring on Forest; however, birds may use the Forest for feeding, and during migration.

Recommendations Include:

Change Management.

Take this species off the sensitive species list for the Forest.

COMMON LOON

Fiscal Year 1996 is the first year for the following table of data and analysis. All data known to exist at this time is in this table.

A General Observation (GOBS) is one made by anyone at anytime that is reported. Reliability of GOBS is often questionable; at present the only interpretation of this data can be common loons are present on the Forest in most years, and they appear to be in low numbers.

The number of stations where a survey was completed looking for wolves is called Survey Station. Surveys have been done for this species, however data is not available or entered into a database at this time.

Common Loon Observations

Year	General Observations	# Loons Reported	# Survey Stations	# Loons Located
Pre 1989	6	10	0	0
1990	2	2	0	0
1991	1	1	0	0
1992	4	5	0	0
1993	8	20	0	0
1994	9	11	0	0
1995	4	4	0	0
1996	10	22	0	0

Habitat and population trends are unknown. There are opportunities to increase nesting habitat along the shores of lakes and possibly increase populations as a result.

Recommendations Include:

Continue monitoring as scheduled.

Establish a protocol and plan for inventorying habitat and species.

Began systematically to survey for species use.

Develop maps of habitat and population trends.

HARLEQUIN DUCK

Fiscal Year 1996 is the first year for the following table of data and analysis. All data known to exist at this time is available, except 1996 GOBS data. Further analysis of this data is needed.

A General Observation (GOBS) is one made by anyone at anytime that is reported. Reliability of GOBS is often questionable; at present the only interpretation of this data can be that Harlequin ducks are present; the Forest is gathering data on this species.

The number of stations where a survey was completed looking for wolves is called Survey Station. No formal surveys have been completed. As information from GOBS is analyzed it may be possible to begin development of a monitoring strategy.

Harlequin Duck Observations

Year	General Observations	# Harlequins Reported	# Survey Stations	# Harlequins Located
Pre 1989	6	12	0	0
1990	8	11	0	0
1991	5	5	0	0
1992	17	38	0	0
1993	16	40	0	0
1994	32	51	0	0
1995	39	98	0	0
1996	9	12	0	0

Habitat is changing above and below dams from management of water levels due to flood events. These changes affect the amount of feeding habitat available and nesting success. Populations are low, and trend of habitat and populations is unknown.

Viability of this species is unknown, but enough information was available from some watershed assessments to develop maps of potential Harlequin duck habitat in 1996.

Recommendations Include:

Continue monitoring as scheduled.

Establish a protocol and plan for inventorying habitat and species.

Develop maps of habitat and population trends.

RED-LEGGED FROG, LARCH MOUNTAIN SALAMANDER AND WESTERN POND TURTLE

Habitat for these species is limited to sites with high water tables for reproduction. This habitat is decreasing in amount and availability to wildlife as it is used by recreationists, livestock, and as roads are built. As roads are built and traffic increases more and more amphibians will be killed as they move from water habitats across roads to forested or other water habitats.

There is a possible connection between raising the water levels of lakes with dams plus fluctuating water levels on amphibian populations. First the shallow water that took thousands of years to build up from erosion and deposition, is now deep water when dams are built and water levels raised. In other words, habitat is changed, likely reduced. Fluctuating water levels are not what amphibians developed through for the last millions of years. So likely there has been a decrease in habitat due to this activity. This action should be studied and the adverse impacts identified to see if their is a remedy.

Maps have been developed (from data available in 1995) to show distribution of some amphibian species. Obviously, more information is needed to determine the range of these species and their population and habitat trends.

The rate of habitat decline has slowed since the implementation of the Northwest Forest Plan but the decreases in populations from roads continues as roads have effects for many years. Habitat quality seems to be improving but the population trends may be decreasing. The Forest is loading all sightings in the WILDOBS database and more inventories are being completed to find out what are the specific trends of habitat and population.

Recommendations Include:

Continue monitoring as scheduled.

Survey ponds, seeps and marshlands on the Forest; survey for amphibians and reptiles around wetlands habitats.

Survey for Larch Mountain and Van Dykes Salamander.

Monitor to determine amphibian population declines from roads.

FISHER

Fiscal Year 1996 is the first year for the following table of data and analysis. All data is not included in this table but will be added and available next year. Further analysis of this data and presentation is needed.

A General Observation (GOBS) is one made by anyone at anytime that is reported. Reliability of GOBS is often questionable; at present the only interpretation of this data can be fisher are likely present but in low numbers.

The number of stations where a survey was completed looking for fisher is called Survey Station. This data is of higher reliability than GOBS; however, the data shows species observations when monitoring was scarce and shows no observations in the last 2 years when significant samples were completed. The data earlier than 1994 is not complete and was experimental in nature. There is still a question of if fisher are present on the Forest, as verification with surveys has not been adequately done.

Fisher Observations

Year	General Observations	# Fisher Reported	# Survey Stations	# Fishers Located
Pre 1989	18	18	0	0
1990	5	5	1	1
1991	2	2	0	0
1992	0	0	0	0
1993	2	2	1	1
1994	0	0	0	0
1995	2	2	50	0
1996	1	1	25	0

Fisher sightings have been entered into WILDOBS, and are used to try verifying fisher existence in this area. A cooperative effort began between the Forest and the WA Department of Fish and Wildlife to verify the existence of fisher on Forest (9,000 acres inventoried). In addition, 2,425 acres of habitat was restored or enhanced, and six structure for this species were installed (*1996 Wildlife, Fish, Rare Plant Report*). A possible fisher den was located.

Surveys have been forwarded to PNW scientists for further analysis, for monitoring the province, and to improve monitoring protocol.

Recommendations Include:

Continue monitoring as scheduled.

Survey for fisher using established protocol.

If fisher are found cooperate with the Forestry Sciences Lab to locate other populations and identify what habitat is being used.

OTHER WILDLIFE

Monitoring Item-

HAWK AND OWL NEST SITES

The goal is to maintain viable populations and provide animals for recreation enjoyment. The monitoring question is:

Are nest sites being protected during implementation of habitat disturbing activities.

In 1995, between 20,000 and 30,000 acres were inventoried for raptor nests. Most often the inventories were for northern goshawk and spotted owl but red-tailed hawk, Coopers hawk, American kestrel, osprey, great-horned owl, and barred owl nests were located.

In most cases, all known nests were protected. It is a high priority to enter nest sites into WILDOBS and get UTM coordinates so sites can be tracked and mapped using GIS. This process began in 1995.

All projects consider known nest locations of hawks and owls in project design. Project conservation measures are planned for protection on a site by site basis.

In some projects, inventories to locate raptor and owl nest sites was not done. In these cases, if a nest site is found during project implementation then conservation measures are implemented.

Known Raptor Nest Sites (January 1, 1997)

Raptor Name	# Known Nest Sites
American Kestrel	2
Bald Eagle	5
Barred Owl	6
Burrowing Owl	1
Cooper's Hawk	9
flammulated Owl	1
Golden Eagle	10
Northern Goshawk	101
Great Horned Owl	3
Long Eared Owl	1
Osprey	59
Peregrine Falcon	2
Prairie Falcon	12
Red Tailed Hawk	13
Sharp-shinned Hawk	5
Spotted Owl	141

Recommendations Include:

Continue monitoring as scheduled.

Survey for a wider variety of species and complete pre-activity surveys to locate nests on all projects. In 1996 the great gray owl surveys will be required for activities implemented in FY97.

Visit known nests and determine whether they are: active or not, any reproductive data, and UTM coordinates.

Enter data into WILDOBS database with UTM coordinates.

SNAILS

The monitoring questions are:

Are species present?

Are species and habitat being protected?

The Forest Plan does not require surveys for snails, and only protection of known sites in 1996. Some inventory work was completed.

All sites known before 1995 were protected. A number of species were found that had not been found here before. Some new species may have been found.

Recommendations Include:

Continue monitoring as scheduled.

Monitoring Item-

RIPARIAN FOR WILDLIFE (Indicators)

The goal is to provide habitat to maintain viable populations. Maintain number, size and distribution of trees and snags to meet habitat capability objectives by management area. The monitoring questions are:

Are populations being maintained as predicted?

Is habitat capability being maintained?

Since the implementation of the Northwest Forest Plan the riparian and water habitats have been maintained, or actions taken to improve habitat, through the *Jobs in the Woods* program. This program continued through 1995-1996. Examples are:

- roads have been moved, surfaced or closed to improve this habitat.
- dispersed recreation sites have been moved, rearranged or closed to decrease the effects to riparian and water habitat.

There are many species using the water and riparian habitat. There were 201 acres of improvements and five structures built plus 30 acres of pond surveys for amphibians completed in 1996. This adds to the amphibian surveys of previous years. Data has been entered into WILDOBS. From this database some trends, areas of use, where inventories are completed, and where inventories are not needed can be determined. After inventories have covered all the potential habitat in sufficient detail, accurate range maps and population trends for amphibians may be determined.

Recommendations Include:

Continue monitoring as scheduled.

Complete entering of existing inventories into WILDOBS database and complete an analysis.

Design inventory plans that will show population trends.

I. TIMBER OFFERED, HARVESTED, AND RELATED SILVICULTURAL ACTIVITIES

Monitoring Item-

TIMBER OFFERED (ALLOWABLE SALE QUANTITY (ASQ) AND TIMBER SALE PROGRAM QUANTITY (TSPQ)

The goal is to achieve planned and assumed volumes of timber sold annually and for the planning period in ASQ and TSPQ for the period from fiscal year 1990 to 1993. From 1994, the goal has been amended by the Northwest Forest Plan. The new term to describe timber offered under the amended Forest Plan is called "probable sale quantity" (PSQ). The objective is to estimate sale levels likely to be achieved (PSQ) as opposed to estimating ceiling or upper-limit harvest levels (ASQ). The PSQ in the Forest Plan is to sell 24.2 million board feet per year.

Timber harvested during FY 1996, as reported in the *Timber Sale Program Information Reporting System, Source and Application of Funds Worksheet* was 91.7 MMBF. Timber Commodity was 2.1 MMBF, Forest Stewardship was 82.8 MMBF, and Personal Use was 6.8 MMBF.

The volume harvested during the same time period has been 200.5 MMBF. Most of the volume offered and harvested is salvage volume from large fires that occurred in 1994. Almost all of the volume (98 percent) that was harvested in FY 1996 was done for Forest Stewardship or Personal Use reasons.

Another indicator utilized is the Program Sale Statement (PSS). The PSS is used as a source of annual program accomplishment in terms of area and volume by timberland suitability class, harvest activity, forest-type group, and product. Cumulatively, this information reflects total Plan accomplishment relative to the long-term sustained yield capacity or the allowable sale quantity (*FSM 2492.12*). The Program

Sale Statement for the Wenatchee National Forest is shown below.

Program Sale Statement

Fiscal Year	Chargeable (MBF)		Non-Chargeable (MBF)	
	Dead	Live	Dead	Live
1993	11,334.45	1,422.17	3,889.25	35.6
1994	6,044.34	7,820.47	2,389.53	181.2
1995	52,317.96	444.80	2,008.49	3.0
1996	62,512.39	12,783.70	6,152.15	13.8
Total	132,219.14	22,471.14	14,439.42	233.6

This increase in volume is associated with the Tyee, Rat Creek, Hatchery, and Round Mountain fires of 1994. The last 2 years have been focused on recovering some of this fire salvage while restoring the affected ecosystems.

The direction in the Forest Plan states that the PSQ levels are estimates. They represent neither minimum levels that must be met, nor maximum levels that cannot be exceeded. They are rough approximations because of: (1) the difficulty associated with predicting actual timber sale levels over the next decade, (2) the discretion that agency land managers possess in administering plans and deciding when and where to offer timber sales, and (3) the complex nature of many of the Standards and Guidelines. The Forest Plan recognizes that it will take time for the land management agencies to develop new timber sales that conform with the planning amendments.

The PSQ on the Wenatchee National Forest is conforming to the direction addressed in the Northwest Forest Plan. The decade total is within 5 percent of the Forest Plan projections.

Recommendations Include:

Continue to sell timber as directed in the Forest Plan.

Continue to monitor PSQ utilizing the STARS and PSS databases and compare volume to projected decade trend.

Monitoring Item-

TIMBER HARVEST UNITS (SIZE, SHAPE AND LOCATION)

The goal is to manage vegetation cover to meet direction on size of openings created by National Forest timber harvest. The monitoring question is:

Are the Forest Plan Standards and Guidelines regarding the size and dispersal of openings and condition of adjacent vegetation (e.g. height of trees in adjacent areas) being appropriately implemented?

Based on the PSQ that was amended by the Northwest Forest Plan, the amount of clearcutting that has been identified in the Land and Resource Management Plan is 484 acres per year. During fiscal year 1996, 91.7 MMBF was harvested from 13,569 acres. Only 9 acres were clearcut (Silva data base). Almost all of the harvest acres (98.9 percent) were selection (sanitation/salvage) and most were from dry working groups (92.9 percent). Most of this volume was harvested from the fires of 1994.

The Forest is meeting its Plan Guide and Objectives. The decrease in harvested acres, along with the shape, size, and location has been accomplished to coincide with the new goals and objectives in the amended Forest Plan.

Recommendations Include:

Continue monitoring as scheduled.

Monitoring Item-

TIMBER HARVEST

The goal is to ensure that regeneration harvests are not prescribed for areas where average annual growth has not generally reached culmination of mean annual increment. The monitoring questions are:

Are stands being harvested at an ages and condition that produces the expected growth measured on an average annual cubic foot basis?

Is the amount of volume removed consistent with amounts sold?

Stands being scheduled for regeneration are within 5 percent of culmination of mean annual increment. Volume removed is within 15 percent of amount sold.

In 1996, only 9 acres were clearcut. Since 1993, the two issues that have been directing the timber harvest have been the Northwest Forest Plan and the salvage related to the wildfires that occurred in 1994. This has reduced the regeneration harvest acreage to near zero. The focus has been to harvest fire salvage (sanitation/selective tree removal) and thinning from below on overstocked stands, especially on the drier ecosystems within the Forest Matrix and associated Late-Successional Reserves.

During Fiscal Year 1996, 91.7 MMBF was harvested and 80.5 MMBF was sold out of 92.5 MMBF that was offered. This is within 12.2 percent of the amount removed.

Recommendations Include:

Continue monitoring as scheduled.

Monitoring Item-

SILVICULTURAL PRACTICES

The goal is to ensure that silvicultural prescriptions are appropriate, effective and consistent with resource objectives for each management area. The monitoring questions are:

How many acres of each planned silvicultural practices have been accomplished?

Have silvicultural prescriptions met objectives set for each management area?

Are managed stands growing at the rates estimated by Forest Plan yield models?

Timber Stand Improvement Activities:
Release and Weeding - 410 acres
Precommercial thinning - 756 acres
Pruning - 5 acres
Fertilization - 103 acres

Regeneration and Intermediate Harvest Activities:
Clearcut - 9 acres
Removal cut - 138 acres
Select cut - 348 acres
Sanitation - 13,074 acres

Recommendations Include:

Continue monitoring as scheduled.

Monitoring Item-

REFORESTATION

The goal is to minimize the amount of time between the removal of existing trees and reforestation with desired species. Monitoring questions include:

Is adequate tree stocking for each management area achieved within the time frame established with the desired silvicultural method?

Have adequate numbers of trees of desired species been established to realize optimum growth for management area?

Reforestation Activities:

Planting with seedlings from known seed source - 5,858 acres

Silvicultural Examination and Prescription - 5,834 acres

Seeding - 50 acres

Site preparation for planting or seeding - 863 acres

Animal control for reforestation - 117 acres

Recommendations Include:

Continue to monitor reforestation activities and survival surveys.

Monitoring Item-

LANDS NOT SUITABLE FOR TIMBER MANAGEMENT

The goal is to verify that technology and /or other information has not been developed to justify reclassifying lands from a "not suitable" status to "suited for timber management", or vice versa. Monitoring questions include:

Have the lands that were identified in the Forest Plan as not suitable for timber management now become suitable for timber management?

Is the suitable/not suitable land classification accurate as identified in the Forest Plan database?

Suitability is being monitored at the District level by the silviculturist. There appear to be no problems with identifying acres that do not meet the Forest Standards and Guidelines. Any new changes are being included in update in the GIS database. Reforestation difficulties still tend to be the limiting factor.

Recommendations Include:

Continue monitoring as scheduled.

J. SOIL, WATER, FISHERIES AND RELATED WATERSHED MANAGEMENT

Monitoring Item-

MAINTENANCE OF LONG-TERM SOIL PRODUCTIVITY

The goal is to manage the soil resources by implementing management practices that maintain or enhance productive soil nutrient and water cycles. The monitoring question is:

Is soil productivity being protected?

Monitoring focuses on the evaluation of detrimental soil disturbance associated with ground disturbing activities, primarily timber harvest. Past monitoring has indicated that existing conditions on nearly all acres subject to ground based harvest entries exceed Forest Plan Standards for detrimental soil disturbance. During the 1995-1996 field seasons soil disturbance/compaction monitoring was conducted on 12 sale units before timber sale harvesting occurred (six on the Entiat District, four on the Leavenworth District and two on the Lake Wenatchee District) In four sales disturbance/compaction monitoring occurred after the harvest as well to investigate the effect of harvesting (all on the Entiat District).

Pre-harvest monitoring results indicated that essentially none of the areas met Forest Plan Standards. These areas have had prior harvest entries that have altered natural surface soil layers and caused detrimental soil disturbance (compaction). Post-harvest results from two units on the Entiat District were subject to variability introduced by a number of factors including interpretation differences between two different sampling crews one year apart. Recognizing the need for improved consistency and more timely availability of results, post-harvest monitoring conducted in 1996 on the Entiat District was completed within the same season by the same crew. For more information see *1996 Soil Monitoring Report-Entiat Ranger District* and *1995-1996 Soil Disturbance Monitoring, Leavenworth and Lake Wenatchee Ranger Districts*.

The Wenatchee National Forest *Ground Based Harvest Policy*, approved in June 1996, has established an analysis and monitoring framework for the planning and implementation of ground disturbing activities. A number of different yarding methods and soil rehabilitation practices were applied and evaluated in 1996. For example, following field trials, the Forests purchased a self-drafting, winged subsoiler for use in rehabilitation work. This device represents the state-of-the-art in treatment of heavily compacted areas such as skidtrails and temporary roads. For more information see *1996 Soil Monitoring Report-Entiat Ranger District*.

Recommendations Include:

Further evaluation.

Continue full implementation and adoption of the Wenatchee National Forest *Ground Based Harvest Policy*.

Complete qualitative and quantitative monitoring of selected sale units, with emphasis on evaluation of non-traditional yarding methods.

Evaluate monitoring techniques that improve consistency and provide a less costly alternative to traditional core sampling methods.

Conduct a Forest level workshop on soil resource management, with emphasis on rehabilitation techniques. Use the sub-soiler to mitigate compaction of skidtrails and temporary roads.

Monitoring Item -

FISH/RIPARIAN STANDARD AND GUIDELINE IMPLEMENTATION

Are Standards, Guidelines and Related BMPs for fish habitat and riparian areas as defined in the Forest Plan (and Northwest Forest Plan) being applied in the design and execution of timber sales, watershed restoration, and other projects where fish/riparian Standards are a concern?

In 1996, the main focus of implementation monitoring was the evaluation of the *Jobs in the Woods* (JITW) and *Burned Area Emergency Restoration* (BAER) watershed projects, especially in light of the severe floods in November 1995 and February 1996 on the Forest. These floods were the largest floods on record for several streams. In addition, an inventory of flood effects was also conducted on the Forest in 1996.

Burned Area Emergency Restoration (BAER) Monitoring

A survey of the condition and effectiveness of BAER channel and hillslope projects in the Tyee fire area was completed in 1996. The goal of these projects was erosion control, either by placing structures in the burned area or by reseeding with grass. In general, BAER rehabilitation measures installed in 1994 and 1995 after the Tyee fire appeared to work well under the weather and runoff conditions experienced during the year. Fortunately, the floods of 1995/1996 were concentrated closer to the Cascade Crest than the Tyee fire area. The rock and log check dams were functioning to store sediment and inhibit channel erosion. The straw bale check dams appeared to work best below road dips and in wide, low gradient ephemeral

reaches. Log terracing of hillslopes was considered to have been an highly effective erosion control treatment. Specific examples of failures of these treatment types could be attributed to improper structure selection, siting or failure to follow installation criteria.

Vegetation monitoring transects were installed in six different vegetation types in moderate to high intensity burn areas within the Tyee Fire. These permanently documented transects will be read at 2 to 3 year intervals, with the primary objectives of evaluating native plant condition and recovery, forage/cover availability, and the performance of the BAER grass seeding done for temporary soil stabilization.

A summary evaluation of the effectiveness of fire rehabilitation seeding within the Tyee fire was completed. Conclusions included observations on how well various grass species performed based on elevation, stand type and rate of development. For example, winter wheat did very well on most sites below 3,500 feet and provided improving ground cover through the first season, as well as excellent litter cover in the second year (1996). Slender wheat was most successful in riparian areas and above 3,500 feet elevation; however, it was slow to develop and provided little cover until the second season. See *Tyee Fire Rehab Monitoring Report, Entiat Ranger District* for more information on the above items.

Jobs in the Woods (JITW) Monitoring

Monitoring of several road related watershed improvement projects in the Manastash and Taneum drainages showed that they were functioning as planned, even after the floods. The projects included replacing a ford with a full spanning bridge across the South Fork Manastash, reducing flood plain soil compaction, installing road crossdrains, and reactivating an overflow channel in Buck Meadows.

More JITW monitoring was planned for 1996, however, monitoring personnel were called off-Forest for much of the summer due to the large number of forest fires in other areas of the West.

Flood Monitoring

An inventory of 1995/1996 flood damage in terms of surface erosion, mass wasting and stream channel instability was compiled. The sites were mapped and a decision was made as to whether Forest management activities were associated with the event. Based on the field reviews and analysis it was determined that most of the hillslope, stream channel, and riparian effects occurred below 4,400 feet in elevation. Of the nine major landtypes identified on the Wenatchee National Forest, the majority of the documented mass wasting/erosion events were located in glacial troughs and structurally controlled mountain slope landforms. However, there was not a complete sampling of the Forest to look for erosion sites. All the searching was done from roads and most of the effort was concentrated on the North end of the Forest. In one watershed, Rainy Creek (a tributary to the Little

Wenatchee), the frequency of mass wasting/erosion was considerably higher on slopes that have been roaded and harvested. Seventy percent of the erosion sites in Rainy Creek were in harvested or young regrowth areas. For more information see *1995-96 Storm Damage Report of Watershed, Stream, and Riparian Effects on the Wenatchee National Forest, Wenatchee National Forest.*

On at least one district, Cle Elum, an analysis was completed of the management related causes of the damage from flooding. Problems included: (1) roads crossing alluvial fans, (2) roads capturing flood flows in the flood plain, (3) roads with an inadequate number or size of crossdrains or culverts, and (4) reduced riparian vegetation resulting in increased rates of bank erosion. For more information see *1996 Watershed Improvement/ Flood Monitoring Report Summary, Cle Elum Ranger District.*

Recommendations Include:

Continue monitoring as scheduled and further evaluation.

The implementation monitoring in 1996 was very useful.

It is recommended that implementation monitoring at some level be conducted and reported annually which is a continuation of the recommendation of past years as well. It is recommended that monitoring in 1997 be focused on implementation of the fire salvage sale program with emphasis on compliance with the Northwest Forest Plan Aquatic Conservation Strategy and also focused on a continuation of JITW project monitoring.

Monitoring Item -

EFFECTIVENESS OF RIPARIAN STANDARDS AND GUIDELINES

Are Standards and Guidelines that describe Desired Future Conditions for specific riparian areas/fish habitat being met?

Measurable Standards for aquatic and riparian habitat structure and function were established in the 1990 Forest Plan. The Standards are to be used as a method to measure attainment of Forest Plan Goals and Objectives for aquatic and riparian habitat. With the adoption of the Northwest Forest Plan these same Standards could be viewed as a method of measuring attainment of the Aquatic Conservation Strategy.

The Wenatchee National Forest Plan Standards and Guidelines for stream structure and function are as follows: For large woody debris the Standard for fish-bearing streams is to have a minimum of 100 pieces per mile of stream with at least 20% of those being $\geq$ 50 feet in length and $\geq$ 20 inches in diameter. The small size woody debris needs to be $\geq$ 50 feet in length and $\geq$ 12 inches in diameter. The

Pool Standards are as follows:

For fish-bearing streams with a gradient less than three percent, one primary pool per six bankfull channel widths; in fish-bearing streams with a gradient ≥ three percent one primary pool per three bankfull channel widths. A primary pool occupies ≥ 50 percent of the low flow channel width and has a maximum low flow depth of ≥ three feet. In non fish-bearing, class III streams there is no depth requirement for the pools and in class IV streams there is no numeric pool standard.

Fine Sediment Standards call for ≤ 20% fine sediment ≤ 1.0mm in diameter in spawning gravels in Forest streams.

The water temperature standard for class I, class II and fish-bearing class III streams calls for a maximum daily temperature ≤ 61 F and an average 7-day maximum ≤ 58 F.

The Wenatchee National Forest has annually implemented a stream survey, sediment, and water temperature monitoring program. The following summarizes the results of the three programs. For more detailed information refer to *Wenatchee National Forest Environmental Baseline for Steelhead and Bull Trout Conferencing/Consultation*, (Environmental Baseline Paper) in prep, completion date June 1, 1997.

Stream Surveys

Between 1989 and 1996, the Forest has completed stream surveys using the standard Region 6 stream survey protocol on over 1,200 miles of stream. The stream survey information is used to determine if individual stream reaches are meeting Standards for pools and in-channel large woody debris. The following is a summary of the compliance of the streams surveyed in 1996 on the Wenatchee National Forest with the Forest Plan Standards and Guidelines (wood and pools only). A more complete analysis of all stream survey data to date will be included in the *Environmental Baseline Paper* cited above.

Large Wood: Thirty-one percent of stream miles met the small size standard, 31 percent met the large size standard, and 31 percent met the combined wood standard. In both the wood and pool case the only stream to meet either standard was both reaches of the Chiwawa River.

Pools: Thirty-one percent of the stream miles met the pool standard when the three foot depth requirement was considered. Removing the depth requirement did not change the results.

The current Forest Standards for stream channel conditions represent a "one-size-fits-all" minimum threshold. The Standards are generally applied at a stream reach level. Using the stream inventory data, the Forest has been reevaluating these "threshold" Standards, to determine if single-value thresholds can be replaced with descriptions of potential natural variability in stream habitat, and understanding the processes "driving" habitat conditions in watersheds. The use of

threshold standards has been questioned in various literature. Watersheds and stream channel conditions are dynamic. Habitat descriptions need to be used in the context of the conditions within the watershed, and how habitat is affected by disturbance processes. Additionally, even if an absolute threshold could be identified, below which the aquatic system is not functioning properly, by the time a threshold is reached most damage to watershed and stream processes has probably occurred.

The Forest is examining the stream inventory data, primarily large wood and pools, to determine current and desired conditions for Forest watersheds. Early results indicate that variability in mean levels of large wood can be reduced by about 30 percent if the data is stratified by subsection (a geomorphic landscape parameter) and climax vegetation. Climax vegetation, amount of large wood, subsection and stream gradient account for about 17 percent of the variation in pool frequencies. To describe what "natural" stream conditions may look like or how past management may have influenced stream habitat the data was analyzed by road density (as a surrogate for human disturbance). Road density appears to account for significant but small differences in mean pool frequency and mean large wood frequency.

One possible approach the Forest is exploring is to move away from threshold standards alone to using a range of conditions one would expect to observe in properly functioning watersheds. These ranges of conditions could then be used as a diagnostic of habitat conditions within different types of watersheds. Complete findings of this approach will be included in the *Environmental Baseline Paper* cited above.

In addition to the stream surveys utilizing the Region 6 Stream Inventory protocol, the Forest has established 174 monumented stream survey cross sections on 14 stream reaches. The reaches are located in a variety of stream and land types. These hydrologic surveys are being used to develop flow information for ungauged watersheds and provide long term monitoring locations to document changes in stream channels. The hydrologic surveys have been incorporated into watershed analyses and the surveys are linked to a riparian disturbance ecology study by the Wenatchee Forestry Sciences Laboratory.

Flood Analysis

One of the goals of the 1996 monitoring program was to document the effects of the 1995/1996 floods on several streams on the Forest. The following is a summary of the report *Integrated Survey Assessment of habitat Conditions and Response to Flooding: Three Case Studies in Two Eastern Cascades Geomorphic Units (Subsections), Wenatchee National Forest*. Data from four types of surveys were integrated in the full report: 1) ecological landunit surveys at the subsection scale as defined by *USDA* (1993) and *Wertz and Arnold* (1992); 2) hydrologic surveys using the protocol of *Emmett* (1972 and 1975); 3) fish habitat surveys, using a Regional Forest Service protocol (*USDA 1996*); and 4) hillslope failure mapping (*Driscoll 1996*). Three rivers with pre- and post-data for a flood of record were compared.

Each type of survey confirmed the trends indicated by the other survey types. Integrating the data provided a much more comprehensive assessment of the survey area than any single survey type alone could have provided. The surveys complement, but do not duplicate each other; each survey type provides unique insights. Integration of the surveys provides an ecosystem framework by linking process to condition; structure to function; and hillslope features to riparian and channel properties and responses.

Results indicate that functioning floodplain width is a diagnostic feature affecting channel properties and behavior, and a key linkage between subsection features and channel condition and dynamics. In most cases, systems with wide functioning floodplains have high sinuosity, which appears to be an important determinant of channel lateral migration.

Upper Chiwawa appears to exemplify a healthy mainstem in Wenatchee Highlands subsection. The system is very dynamic having high rates of lateral channel migration (up to 9 ft/yr). However on the reach scale, habitat parameters such as bankfull width and depth, pool area, and large woody debris (LWD) / mile, are very stable. Abundant LWD and high sinuosity may interact in a self-reinforcing cycle; both appear to be keys to creation and maintenance of high quality habitat in the Chiwawa.

Geomorphic processes shape Nason in similar ways to Chiwawa. Particular Chiwawa subreaches may provide "reference" conditions for particular Nason subreaches. Human development in Nason Creek appears to have seriously impacted habitat conditions, as well as habitat resiliency to disturbance. Large woody debris and pools did not remain stable in Nason following flooding; the direction and magnitude of the responses varied between flood events and channel reaches, but ranged beyond 50 percent loss or gain of LWD/mile and pool area.

Stafford Creek functions differently from Chiwawa and Nason for a variety of reasons. Because of geomorphic features, extensive near-surface aquifers and floodplain, wetlands do not occur. Valley form is narrower: at the sites sampled, floodplains were narrower, and more downcutting occurred. Narrower, higher gradient valleys appear correlated with less sinuous, higher gradient channels, with reduced lateral migration. Due to sinuosity and gradient, pool formation differed. A higher proportion of pools were formed by stepping and plunging rather than by meander bends. There was a corresponding shift in pool shape (shorter) and in streambed substrate (larger).

Instream LWD abundance does not appear to differ between the Wenatchee Highlands and Upper Yakima Swauk (UYS) Sandstone Hills subsections. Reaches 1 and 2 of Stafford Creek have low LWD abundance relative to other streams in the UYS Sandstone Hills subsection; these Stafford reaches are constrained by a road and have experienced riparian logging. Because this study does not include an unmanaged "reference" site for the UYS Sandstone Hills subsection, we cannot

assign causality (anthropogenic vs geomorphic) to a number of characteristics of Stafford Creek including LWD abundance, LWD complexes, LWD response to flood, percent pool habitat, and channel downcutting.

Because floodplain loss can lead to downcutting in these systems, and downcutting can lead to floodplain loss, a cycle can be initiated which fundamentally alters channel character (type). Terraces in Stafford Creek and in other Swauk sandstone systems indicate a historic precedent to the existing downcutting-dominated regime. Aging the initiation of these terraces might help us to understand whether Stafford is responding to natural (especially climatic) or anthropogenic influences in its current downcutting regime.

The strength of this study lies in the integration of the different survey types. Only through integration of all of the surveys could we characterize Chiwawa as a healthy system, dynamic yet stable, and Nason as at-risk, with altered channel condition and response resulting in unstable habitat conditions.

In one case a stream in a relatively unmanaged basin was functioning well through the flood, another in a more intensely managed basin saw large fluctuations in LWD and pool frequencies after the 1990 and 1995/1996 floods, and in a third stream changes in streamflow and survey methodology between the pre and post flood surveys prevented precise comparisons of changes due to the flood.

High Lakes Surveys

Three lakes were sampled on the Forest during 1996. The purpose of the surveys is to describe the physical, chemical and biological characteristics of the lakewater and also to describe the habitat of, and human impacts to, the lake shore. There were problems with the water quality protocol. The protocol was adjusted to provide comparable data for air quality objectives.

Deviations from Standards occurred at all three lakes, Swamp Lake and Dewey Lake in the William O. Douglas Wilderness Area, Naches Ranger District and Schaeffer Lake in the Glacier Peaks Wilderness Area, Lake Wenatchee Ranger District. At the first two lakes, coliform bacteria counts were high along with a high E. coli count at Dewey Lake, the only lake where that analysis was conducted. At all three lakes a large percentage of the campsites were within 100 feet of the lakeshore and a large number also showed compaction.

Recommendations Include:

Further Evaluation. The following recommendations are continuations of the 1996 recommendations.

Continue the integrated hydrologic surveys using the Region 6 stream survey protocol and the hydrologic cross sections to better describe and monitor riparian/channel conditions and aid in developing linkages to upslope processes. This will be an

important linkage for watershed analysis. In 1997, surveys will include streams in unroaded or lightly managed systems to help determine if expected habitat condition patterns can be determined for different channel types within different landtypes and to support future watershed analysis.

Continue the high lakes surveys. Coordinate the surveys with wilderness personnel. The information is useful not only for local management concerns, but also is helpful as a baseline to measure regional air quality changes.

Fine Sediment

Monitoring fine sediment levels in spawning gravels began with a few streams in 1990 and has increased to 84 sampled reaches, although some reaches were sampled only once. Most of the monitoring has occurred in the Yakima River Basin with efforts expanding to the Wenatchee and Entiat subbasins in recent years. The monitoring has shown that there are a number of streams on the Forest currently exceeding the Forest Plan fine sediment standard. Only data for the north half of the Forest (10 reaches in five streams) was available in time for this report which severely limits comparisons to previous years. Overall, the trend for 1996 was for a decrease in fine sediment level in five reaches, no appreciable change in two reaches and an increase in three reaches (two in the Chiwawa and one in the Entiat). A yellow light condition definition (fines from 15 percent to 20 percent) has been adopted from the Resource Management Committee on the Upper Yakima watershed. Reaches of the Mad River, Entiat River, and the Chiwawa River had yellow light fine sediment levels, while the reaches of the Chiwawa River and Kahler Creek exceeded the fine sediment standard. See *1996 Sediment Monitoring Report, Chiwawa River, Chikamin Creek and Kahler Creek, Lake Wenatchee Ranger District" and "1996 Sediment Monitoring Report, Entiat River, Mad River, Entiat Ranger District* for more information.

Little information is available from "baseline" streams so it is difficult to determine how trends in fine sediment are related to natural processes or human disturbance. Generally, the highest fine sediment levels have been found in streams which flow within landforms that would be expected to be more likely to produce fine sediment. The lowest fine sediment levels have been observed in stream reaches least impacted by ground disturbing activities.

Regardless of the causes, monitoring shows that existing fine sediment levels are a concern in some stream reaches and are exceeding the Forest Standard in others. Activities which will tend to increase fine sediment deposition in these streams would not be consistent with the Aquatic Conservation Strategy, especially in Key Watersheds, unless concurrent restoration occurs which would be expected to reduce overall sediment delivery to the system. In fact much of the watershed

restoration completed to date has been in these "problem" watersheds. Stream reaches exceeding Standards in past years are found in the mainstem Entiat; Kahler Creek, the lower White River (glacial flour may be a factor), Chiwawa River, Peshastin Creek, Tronsen Creek, and Mission Creek in the Wenatchee Subbasin; Cabin Creek, Little Creek, West Fork Teanaway, North Fork Manastash, South Fork Manastash, Taneum and North Fork Taneum in the Upper Yakima Subbasin; and Pyramid Creek in the Naches Subbasin.

A more complete analysis of fine sediment will occur in the *Environmental Baseline Paper* cited above.

Recommendations

Further Evaluation. The following recommendations are continuations of the 1996 recommendations.

Continue to investigate differences in fine sediment amounts and trends in managed and relatively unmanaged watersheds of different landtypes. This is coordinated with the Yakama Indian Nation.

Focus watershed restoration on those watersheds, especially within key watersheds or watersheds containing Candidate, Threatened or Endangered aquatic species where fine sediment exceeds the Standards or are above a 15 percent "yellow light" with increasing trends.

Continue monitoring and expand monitoring network. Possibly after a 5 year trend is established, monitor some reaches in alternate years so more streams can be sampled with the present level of effort. In 1996, this expansion into relatively unmanaged watersheds occurred.

Include a .85mm sieve in all sample processing so that level of fines can be assessed and compared to Department of Natural Resources and Yakama Indian Nation results. The technical support to make these changes is already underway for 1997.

Stream Temperature

The Forest has been monitoring stream temperatures since 1990. The following is a summary of the recording thermograph data.

Year	# streams exceeding standard/ # streams sampled	# stream days exceed daily max	# stream days exceed avg 7 day max	# stream days sampled
1990	3/3 (100%)	36	64	445
1991	9/12 (75%)	153	318	2065
1992	10/11 (91%)	351	478	3492
1993	13/17 (76%)	264	472	1863
1994	24/26 (92%)	1192	1872	4382
1995	30/57 (53%)	540	1143	5470
1996	35/45 (78%)	703	1108	3317

Stream temperatures are influenced by water flow and air temperatures; and, in many cases different streams have been measured in different years further complicating a picture of trend. While 1996 had good streamflows, air temperatures were warm.

A number of streams, especially mainstem tributaries, exceed Temperature Standards for some period during the summer. Therefore, activities which may cause an increase in stream temperature need to be avoided, unless watershed analysis and subsequent environmental analysis show the activity will meet the Aquatic Conservation Strategy and be in compliance with Standards.

Based on recent available data, the most severe temperature problems on the Forest occur in: Oak Creek, the Bumping River, the Little Naches River, Swauk Creek, Middle and West Fork Teanaway, Taneum Creek, Waptus River, Cooper River, Mission Creek, Peshastin Creek, Nason Creek, and Mad River.

For more information on 1996 results see *1996 Stream Temperature Monitoring Report, Entiat and Chelan Ranger Districts* and *1996 Temperature Monitoring, Leavenworth and Lake Wenatchee Ranger Districts.*

Recommendations Include:

Further Evaluation. The following recommendations are continuations of the 1996 recommendations.

A need is recognized to further examine the temperature data. We are currently exploring ways to extract more information from the existing data but further analysis will not occur until Fiscal Year 1997.

Monitoring Item -

FISH MANAGEMENT INDICATOR SPECIES (MIS) POPULATIONS

Are viable populations of Management Indicator Species (MIS) being maintained?

Fish chosen to be MIS on the Wenatchee National Forest are anadromous salmonids, bull trout, and cutthroat trout. Portions of five subbasins lie within the boundaries of the Forest; the Naches and Upper Yakima within the Yakima River Basin, the Wenatchee, Entiat and Chelan. Anadromous fish are native to all but the Chelan. Spring chinook salmon and steelhead trout are found in the Naches and Upper Yakima; spring and summer chinook, sockeye salmon and steelhead are found in the Wenatchee; and spring and summer chinook, some sockeye salmon and steelhead inhabit the Entiat. The Forest has not been actively monitoring anadromous fish returns due to established monitoring programs at mainstem Columbia River dams; Yakama Indian Nation spawning surveys in the Yakama River Basin; and Chelan County PUD spawning surveys in the Wenatchee and Entiat Rivers.

Spring Chinook Salmon

All spring chinook stocks on the Forest are considered to be depressed and returns to the Entiat and Wenatchee systems in the last 2 years were the lowest on record, while returns to the Naches system in the last 2 years are the 3rd and 4th lowest returns on record.

Yakima River Spring Chinook Redd Counts 1990-1996

	1990	1991	1992	1993	1994	1995	1996
Naches Subbasin	464	460	425	554	272	104	184
Upper Yakima Subbasin	773	630	1,246	656	290	117	814

Data provided by Lee Carlson, Yakama Indian Nation

Spring Chinook Redd Surveys Wenatchee and Entiat Subbasins 1990-1995

	1990	1991	1992	1993	1994	1995	1996
Wenatchee Subbasin	446	251	491	536	125	23	73
Entiat Subbasin	83	32	42	100	24	1	8

Entiat Subbasin data from Table 1 in *Spring and Summer Chinook salmon and Sockeye Salmon Spawning Ground Surveys on the Entiat River*, 1996. U.S. Fish and Wildlife Service, Mid-Columbia Fisheries Resource Office. Leavenworth Wa. David Carie, author. Wenatchee Subbasin Data from *Spring and Summer Chinook Spawning Ground Surveys on the Wenatchee River Basin.* 1996. Chelan County PUD. Wenatchee, Wa. Peven and Mosey authors; and *Status of Spring Chinook Salmon in the Mid-Columbia Region.* 1995. Chapman and others. Don Chapman Consultants, Inc. Boise Idaho. Data includes redd counts less Icicle River counts.

As is evident from the above information, the status of spring chinook within the subbasins is disturbing, to the point that the continued existence of the runs other than the hatchery stocks is a concern. **The status of the Wenatchee and Entiat stocks appears critical.** There is some information that over the last several years spawner to recruitment ratios have been below that necessary to perpetuate the runs (*Larry LaVoy, Washington Department of Fish and Wildlife personnel communication*). The cause of the recent slide is not known but diminishing returns within other portions in the Columbia Basin point to possible changes in mainstem and/or ocean conditions as well as any factors affecting the runs in their natal subbasins. Given their status, care needs to be taken to make sure that no management action has a negative impact on chinook habitat, in particular fine sediment, temperature and habitat complexity. It is interesting to note that bull trout, found more in stream headwaters, are not following this same declining trend.

Summer Chinook Salmon

Naturally, spawning summer chinook salmon are found in the Entiat and Wenatchee subbasins. Summer chinook are extinct in the Yakima River Basin and the historical range probably never extended onto the National Forest. It has been suggested that summer chinook may not have been native to the Entiat River system but that the existing run may be an artifact of past hatchery outplants as part of the Grand Coulee Fish Maintenance Project. Regardless, they are part of the Upper Columbia summer/fall chinook population. Summer chinook returns to the Entiat have been sporadic since redd surveys have been conducted beginning in 1957, ranging from zero redds counted to 55, with an average count of 13 during the period of 1957 to 1991. No formal redd surveys were conducted after 1991 until 1995 when personnel from the U.S. Fish and Wildlife Service conducted redd surveys. A total 46 redds were observed, with 45 redds observed in 1996. While no formal redd surveys were conducted between 1992 and 1994, summer chinook were observed spawning in the Entiat during those years.

Summer chinook returns have been down in the Wenatchee the last two years with current numbers below the 10 year average. An interesting trend with summer chinook is an increase in the numbers of fish spawning in the Leavenworth area and upstream.

Wenatchee River Summer Chinook Redd Surveys 1990-1995

	1990	1991	1993	1994	1995	1996
Redd Counts	2,479	2,180	2,334	2,426	1,872	1,435

(Data from Appendix A4 in Peven. Charles and T.R. Mosey. *Spring and summer chinook spawning ground surveys on the Wenatchee River Basin, 1996.* Chelan County Public Utility District. Wenatchee, Wa. December 1996.

Sockeye Salmon

The Wenatchee River supports one of the last two sockeye salmon populations in the Columbia River. Annual returns to the Wenatchee River can be highly variable possibly reflecting ocean conditions. Sockeye salmon returns to the Wenatchee River averages about 30,000 adults. In 1993 the adult return was about 37,000 fish while in 1994 the return was down to a little over 9,000 (*Larry LaVoy Washington Department of Fish and Wildlife, personnel communication*). The 1995 return was even worse than 1994. Using numbers from the Fish Passage Center and subtracting sockeye counts over Rock Island Dam from Rocky Reach only 4,476 adult sockeye would be estimated to have escaped to the Wenatchee system. In 1996 numbers improved somewhat to 7,566 still substantially below average. Ocean conditions are thought to be a major factor in the observed sockeye population fluctuations although some of this current decline could be due to effects of the 1990 flood. The continued low levels over the last 3 years will result in a heightened level of concern for the stock if returns do not rebound.

Summer Steelhead

Summer steelhead populations on the forest are a mix of naturally spawning and hatchery fish. All stocks on the Forest are considered to be depressed and low numbers of naturally produced returning adults is a concern. The returns to the Wenatchee drainage are displayed below. The numbers are provided by *Larry LaVoy, Washington Department of Fish and Wildlife.*

Wenatchee River Summer Steelhead Escapement, Return Years 1990/91 - 1995/96

Return Year	90/91	91/92	92/93	93/94	94/95	95/96
Hatchery	1,174	2,037	3,722	1,381	2,065	1,710
Wild	608	937	816	517	625	698
Total	1,782	2,974	4,538	1,892	2,690	2,408

Yakima River Summer Steelhead Escapement, Return Years 1990-1996

Return Year	90	91	92	93	94	95	96
Hatchery	87	104	251	80	14	98	72
Wild	727	730	2,014	1,104	540	820	665
Total	814	834	2,265	1,184	554	918	737

Data provided by *Bruce Watson, Yakama Indian Nation.*

No information exists of steelhead returns to the Entiat system although numbers appear to be low.

Bull Trout

Bull trout are considered a Candidate species by the U.S. Fish and Wildlife Service (listing under the Endangered Species Act is warranted but precluded because of other species management priorities). Bull trout are found in all subbasins on the Forest except the Chelan. Historically bull trout did inhabit the Chelan subbasin but are now thought to be extinct.

The Wenatchee National Forest, the WA Department of Fish and Wildlife and the U.S. Fish and Wildlife Service are cooperatively monitoring bull trout. Redd surveys, using a standardized protocol, have been conducted annually on nine "index" streams or reaches of streams since 1989. A tenth stream was added in 1993. The monitoring focuses on migratory populations, either fluvial (adults ascend a tributary stream from a larger stream for spawning, the juveniles rear initially in the tributary before returning to the larger stream) or adfluvial (adults migrate from a lake to tributary streams to spawn).

The 1996 count is the second highest on record with the 1995 being the highest.

Total Bull Trout Redds on the Wenatchee National Forest

Stream / Year	1989	1990	1991	1992	1993	1994	1995	1996
Entiat River								
Mad River	15	17	21	16	10	17	16	23
Wenatchee River								
Rock Cr (Chiwawa)	114	64	239	205	179	169	313	258
Chikamin Cr (Chiwawa)	39	22	71	16	19	19	66	67
Phelps Cr (Chiwawa)	23	7	22	34	32	19	26	33
Panther Cr (White R.)	33	7	37	26	45	48	26	29
Yakima River								
Box Canyon Cr (Kachess)	0	5	9	5	4	11	4	8
Gold Cr (Keechelus)	3	11	16	14	11	16	13	51
Deep Cr (Bumping)	17	15	84	78	45	12	101	46
Indian Cr (Tieton R.)	39	69	123	142	140	179	201	193
SF Tieton R		32			38	167	95	233
Total Redd Cnt	283	217	622	536	485	490	766	708

(excluding SF Tieton R.)

Forest-wide trends are not as meaningful as population changes observed in individual populations. With the short period of time monitoring has taken place, there are no clear trends in the populations other than in one stream. Indian Creek in the Tieton River drainage definitely displays an upward trend. The other streams display annual fluctuations in returning adults; however, all but one of the streams is at or above its 1989-1996 average redd count.

Streams in the Chiwawa and White River drainages saw relatively stable numbers in 1996 except for an 18 percent reduction in Rock Creek. Still the 1996 Rock Creek redd count is the second highest on record. Within the Tieton River drainage South Fork Tieton River displayed a dramatic increase in redds observed while the Indian Creek spawning population was stable from the previous year. Deep Creek, a Bumping Lake tributary, had the largest decrease at 54%. The Mad River, Entiat drainage spawning count increased from 1995 to its highest count on record (23 redds) but absolute numbers are very low. Box Canyon Creek (the only known spawning tributary to Kachess Lake) increased, but the main concern for the Box Canyon populations is the low numbers of fish in all years. The highest number of redds counted thus far was only 11 in 1994. A similar concern exists for Gold Creek, the only known spawning tributary to Keechelus Lake. While the redd count increased to its highest value on record, that number is only 51 with the 1989-1996 average at 17.

Isolation and low numbers are potential problems facing bull trout populations on the Forest. Only in the upper Wenatchee River, including the Chiwawa River system does there appear to be somewhat strong local populations that are "connected" to each other. These local populations are probably part of a larger metapopulation that may include Lake Wenatchee and possibly the upper Wenatchee River. Migrating bull trout have been documented in the Chelan County PUD weir near the confluence of the Chiwawa with the Wenatchee River, suggesting bull trout are migrating up the Chiwawa from the mainstem Wenatchee and/or Lake Wenatchee.

The status of bull trout in the Entiat system is unclear but it may be tenuous. There is only one tributary stream with a known spawning population. Bull trout have been observed spawning in the mainstem Entiat but the status of the mainstem spawning population is not known.

The greatest concern for the continued existence of bull trout is in the Keechelus and Kachess Lakes. These populations are isolated above dams with only one known spawning stream, and in the case of Kachess the numbers of spawners in any year is extremely low. Bull trout in the Tieton system above Rimrock Lake, and in the Bumping above Bumping Lake, are also isolated; however, the Bumping population appears to be larger than in Kachess and Keechelus, and in Rimrock Lake there are at least two spawning streams with relatively strong populations.

In 1996, work also occurred to fill in gaps of knowledge concerning bull trout distribution. A fluvial population was found in the Cle Elum River and bull trout were documented in the Waptus River. Bull trout were found in Mineral Creek in the Kachess system. A concentration of bull trout was also found in the American River in what may turn out to be a spawning area.

Westslope Cutthroat

Other than distribution we have no empirical information on westslope cutthroat trout populations. Westslope cutthroat are widely distributed on the Forest and many populations appear strong. In fact, the current distribution of westslope cutthroat may be greater than the historical due to stocking. The bigger question with the cutthroat populations is the degree that genetic introgression has occurred as the result of a long history of stocking exotic rainbow trout. Recent work being completed by the U.S. Fish and Wildlife Service may shed light on this question. Special management may need to be considered for areas found to have pure westslope in order to maintain the evolutionary legacy of the species.

Recommendations Include:

Further Evaluation. The following recommendations are continuations of the 1995 recommendations.

The status of spring chinook salmon appears very precarious. It is suggested that even though spring chinook are not formally listed under the Endangered Species Act that we begin to manage as such. Watershed restoration should be concentrated not just in watersheds that are important to bull trout and steelhead but also in those that are important to spring chinook as well.

Continue monitoring all bull trout index streams. Establishing long term trends will not only assist with assessing the status of the local populations but provide an index of conditions within the larger system affecting the metapopulation. This information may indirectly be useful in interpreting trends in other populations. For example, bull trout populations sharing stream systems with spring chinook salmon populations on the Forest are not exhibiting the same downward population declines; possibly indicating substantial factor(s) affecting the salmon are occurring off Forest. Spawning surveys on the index streams are planned to be completed annually.

Continue to better define native salmonid distribution and status on the Forest. Streams to monitor will be determined at the annual monitoring meeting in coordination the with the Yakama Indian Nation.

The conservation of bull trout needs to be a high priority in the Mad, Chiwawa, Deep Creek, South Fork Tieton and Indian Creeks as these are important core habitats. Conservation and active restoration need to be priorities for management in the Box Canyon and Gold Creek watersheds as bull trout populations in these watersheds may be particularly "at risk".

Work with Fish and Wildlife Service to better define genetic characteristics of westslope cutthroat trout and redband trout on the Forest. Management of watersheds with "essentially pure" populations should be managed to reduce the risk of exotic introduction and conserve habitat for those populations.

Complete the conservation strategy for native salmonid populations within each subbasin including the location of key subwatersheds within both the key and "non-key" watersheds. The strategy builds upon the Aquatic Conservation Strategy. The *Environmental Baseline Paper* cited above will be an important start.

Continue to better define aquatic communities on the Forest, especially the distribution and if possible status of non-salmonid fish and aquatic mollusks and brook lamprey.

Monitoring Item -

AQUATIC HABITAT OBJECTIVES

The monitoring question is:

Are stream and habitat improvement projects meeting Aquatic habitat objectives as stated in the Forest Plan, Policy Implementation Guide (PIG), and Salmon Summit?

Fish habitat improvement projects traditionally include placement of large wood or boulder structures to create a habitat element thought to be in short supply, fish passage around man-made or natural barriers, creation of off-channel habitat to compensate for lost side channel habitat.

The Wenatchee National Forest has been changing its philosophy towards habitat improvement projects. In the past, projects were generally based on site or reach specific assessments which did not necessarily reflect priority needs of the watershed as a whole. The focus on future projects should be on restoring the natural watershed and channel processes to provide as naturally functioning watershed as is possible. While in-channel projects may still be implemented to create important habitat conditions in the near term, or to assist in the recovery process, most projects should address conditions that are leading to degradation or causing a change in the natural delivery of water, sediment and organic material to stream channels.

Land systems inventories, which has been completed for the Forest, should help identify important watershed processes. From this mapping, the dominant delivery mechanisms for water, sediment and organic material to channels can be identified. Improvement projects, not only in-channel but more likely upslope, can then be designed to return the system to conditions more like those expected under the natural disturbance regime. Watershed analysis will help identify the current conditions and, given other ecological and management objectives, identify a desired condition. Improvement projects should then be based on attaining the desired ecological conditions.

It is important though to look at past improvement projects to determine how the projects worked in terms of meeting project objectives. Such information can benefit future project work. Past projects have been monitored in two ways. The first is a cursory overview of projects asking the question; are improvements in place and appear to be meeting habitat/watershed objectives. This first approach is a type of implementation monitoring. The second has been a form of effectiveness monitoring; not only are the projects creating the desired habitat conditions but are the fish or other resource of interest responding as expected?

A level I structure monitoring survey (determines the presence, movement, or loss of a structure) was conducted on nine streams on the Wenatchee National Forest. A total of 219 structures were identified, 71 percent (156 structures) were in place, 15 percent (33 structures) had shifted on site, and 14 percent (30 structures) had disappeared from the area. Of the 156 structures still in place, 96 percent were either fully or partially meeting the original objectives, while 85 percent of the structures that had shifted on site were believed to be at least partially meeting the project objectives. Many of these structures have gone through one or more major floods.

Past passage improvements appear to have been effective. Salmon Falls fishway provided passage around Salmon Falls on the Little Naches River to what is believed to be historical salmon habitat. Salmon have been observed above the falls. The Naches Ranger District has also monitored a number of culverts where improvements were made to allow resident trout passage. The treatments were found to be effective.

The effectiveness of past instream projects for increasing fish production is difficult to assess for a number of reasons. First, unless limiting factors within the watershed have been carefully assessed it is not known if the production "bottleneck" has been addressed. Most past projects have also treated fairly small areas. Attempts have been made to assess the effectiveness of a project on Mission Creek, Nason Creek, and the off-channel projects on the Naches Ranger District. The Mission Creek and Nason Creek projects appear to have been effective in that the fish seem to have responded positively to structure placement. See *Nason Creek, 1996 Level III Monitoring Report, Lake Wenatchee Ranger District* for more information on the Nason Creek Project. Juvenile chinook and rainbow/steelhead as well as other fish species rapidly colonize the created off-channel habitat. These projects have not been

evaluated on a watershed basis, so all that can be stated is fish appear to have responded positively.

Recommendations Include:

Continue monitoring as scheduled. The following recommendations are continuations of the 1996 recommendations.

Continue to monitor the longevity of the projects. This will be important to design of future watershed restoration projects.

The monitoring effort should focus on evaluating watershed restoration projects.

Monitoring Item -

AQUATIC ECOSYSTEMS

Is the ecological health of the aquatic ecosystems recovering or sufficiently maintained to support stable and well-distributed populations of fish species and stocks?

This is a difficult monitoring question to answer, incorporating the elements of preceding monitoring questions. The monitoring program since 1989 has been an attempt to answer this question. As monitoring and evaluation continues, the status of aquatic ecosystems may become clearer. Clearly wild stocks of spring chinook and summer steelhead on the Forest are not faring well. This could be an indicator of problems with freshwater habitat. But bull trout inhabiting the same watersheds are not showing the same declines. Factors off the National Forest are likely responsible for much of the observed decline in the spring chinook and summer steelhead populations. Bull trout populations appear somewhat stable around sometimes large annual spawning population fluctuations. Bull trout distribution though, is reduced from historic and some populations appear to have dangerously low numbers. Wild or native westslope cutthroat and redband (rainbow) trout appear to be numerous and well distributed. The is some information though that many of these populations may be hybridized with introduced fish. Better information on the distribution and status of fish communities may provide insight to this monitoring question.

Recent information suggests that the large stream systems on the Forest may be recovering from degradation early in the century (*Ecological Health of River Basins in Forested Regions of Eastern Washington and Oregon*, Wissmar and others 1994. PNW-GTR-326). In some cases, such as portions of the Yakima, the improvement is relative as the streams were seriously impacted early in the century.

Stream habitat conditions often are below Forest Plan Standards, but whether the conditions are indicative of unhealthy watersheds or the Standards are not

appropriate is not known; the question is being investigated. Fine sediment does appear to be a problem in some streams indicating delivery amounts and rates may be changed from historic, and the conditions in some streams may harmful to native salmonids (and other aquatic species). Further monitoring is needed though to determine if management, including restoration efforts, is meeting Aquatic Conservation Strategy Objectives. An integrated analysis linking fish habitat surveys, hydrologic surveys and land systems inventory will produce the most complete understanding of what healthy streams should look like.

Recommendations Include:

Further Evaluation.

Continue monitoring and further refine the integrated analysis linking fish habitat surveys, hydrologic surveys, and land systems inventory.

K. RANGE MANAGEMENT AND RELATED ACTIVITIES

Monitoring Item-

FORAGE UTILIZATION

The goal is to provide opportunities to maintain and/or enhance desired plant communities and other resource values while permitting livestock grazing. The monitoring question is:

Are the forage utilization levels consistent with goals for maintaining riparian and upland health?

In 1996, three environmental assessments were completed on three grazing allotments. This analysis was the first attempt to improve rangeland suitability with 1960 vintage surveys. Suitable rangeland declined on the average of approximately 55 percent. A number of resource conditions likely contribute to this decline: (1) reduction in timber harvest, (2) recovery of historic fires, (3) forest encroachment into meadows and rangelands, (4) increased crown closure of woodland rangelands, and (5) increased elk populations on the south half of the Forest. Overstocking of forest stands directly affects understory forage production.

Grazing utilization monitoring was completed in six out of 22 active allotments. It was noted that elk use ranged from 10 to 20 percent prior to the domestic livestock turn-on date. In some cases, administrative actions have already been implemented, and in others continued monitoring will determine if grazing levels should be adjusted. Significant administrative actions taken include:

1. All annual grazing plans will include Forest Plan Standards and be reviewed by the permittees prior to the grazing season.
2. Conversion of cattle to sheep to protect riparian and wet meadows on one allotment.

3. Temporary closure on one allotment for resource protection; allotment was involved in 1994 fires.
4. Actual use was reduced by at least 55 percent on three cattle allotments.
5. Three cattle allotments were in their 3rd year of rest.
6. Four grazing permits were terminated.
7. Grazing was temporarily approved in Mills Canyon to rest the 1994 fire area.
8. Trespass is a recurring problem on one District; U.S. Attorney has taken a stand to increase penalties in the future.
9. On two sheep allotments it was noted that grazing areas were within Standards.
10. One permit waived to Forest Service will not be reallocated until allotment conditions improve.

Recommendations Include:

Continue monitoring as scheduled.

If necessary, take administrative action so livestock grazing is in compliance with Forest Plan Standards and Guidelines.

L. ROAD MANAGEMENT

Monitoring Item-

ROAD CONSTRUCTION/RECONSTRUCTION

The goal is to ensure that the transportation system is being constructed/reconstructed to serve the planned resource management objectives at the assumed annual rates.

Roads are to be designed as safe and durable structures suitable for their intended uses. Within the Riparian-Aquatic Habitat Protection Zone, there are 11 Management Practices intended to minimize the amount of roads and their impacts. The Threshold of Variability for the road miles is 25 percent of the annual projections and 10 percent for the decade. Additional Standards and Guidelines are contained in the Northwest Forest Plan.

Unit of Measure	Forest Plan Decade Average	FY 96 Actual
Forest Road Program		
Construction Miles	2	0.1
Reconstruction Miles	16	7.9
Timber Purchaser		
Construction Miles	80	1
Reconstruction Miles	3	1

The floods of 1995-1996 damaged a large portion of the transportation system. Significant damage occurred at approximately 260 locations. Repair costs are estimated at nearly $5 million. Culverts washing out was a large part of the damage; these are being replaced to carry the 100 year flood in accordance with the Forest Plan. Approximately 7.9 miles of roads were reconstructed as part of the *Jobs in the Woods* program. All of this reconstruction was intended to correct or mitigate the negative effects of roads. There was no net increase of roads in key watersheds or any new roads in roadless areas. These were additional items required to be monitored by the Northwest Forest Plan.

Forest Road Program: The estimated average annual output for arterial and collector road construction and reconstruction is 18 miles per year. The actual accomplishment for FY 1996 was 8 miles. This is outside of the 25 percent annual Threshold of Variability. The original estimates were based upon the historical amount of funds available for this purpose.

Timber Purchaser: The estimated average annual output for Timber Purchaser Road Construction is 83 miles. The actual accomplishment for FY 1996 was 2 miles. This represents 2.4 percent of the projected output. The amount of road construction and reconstruction by Timber Purchasers is entirely dependent upon the amount and location of the timber contracted for harvesting. Failure to reach the estimated output was caused by court injunctions related to the controversy over the northern spotted owl. The assumption that this system will be completed in the first 18 years of the Plan is not valid. Over the next few years the amount of Timber Purchaser road construction and reconstruction will depend upon the location and rate of the recovery efforts in burned areas.

Recommendations Include:

Continue monitoring as scheduled.

Monitoring indicates management direction is being achieved, continue current course.

Monitoring Item-

ROAD MAINTENANCE

The goal is to ensure that the transportation system is being maintained to the appropriate standard to serve the planned resource management objectives.

Unit of Measure	Forest Plan Decade Average	FY 96 Actual
Roads Maintained for:		
Passenger Cars Miles	1031	520
High Clearance Vehicles Miles	3202	3700

Given that thousands of decisions for maintenance of individual roads are made on the ground with consideration for a number of annual and seasonal factors (condition, surface type, weather, traffic, mix, volume, etc.) we do not consider this variability from the Forest Plan estimates to be significant on an annual basis.

We are beginning to experience the effects of the loss of maintenance performed by Timber Purchasers. In the past, the Purchasers have performed approximately 1 to 1.5 million dollars of maintenance annually; if we are unable to increase appropriated (NRFD) road maintenance funds there could be a significant reduction in the amount of the Forest roads available to the public and a reduction in level of comfort and ease of access. This year, 64 percent of the roads were not maintained to Standard.

Recommendations Include:

Continue monitoring as scheduled.

Due to the uncertainty about future funding and harvest levels, it is premature to make assumptions about revised maintenance levels; however, it is logical to assume that should maintenance funds continue to decrease, more roads will be closed to public use.

Monitoring Item-

ROADS CLOSED/OBLITERATED

The goal is to determine how much of the transportation system is no longer needed for management activities. Short and long term needs are to be considered. Roads can be closed and placed in Maintenance Level I or obliterated and removed from the transportation system inventory.

The Forest Plan Standard is that unless there is a resource need documented in the project analysis, currently open roads will remain open and newly constructed roads will be closed to public access by vehicle.

Unit of Measure	Forest Plan Decade Average	FY 96 Actual
Roads Closed Total System Miles	1703	990
Roads Obliterated Miles	NA	8

The Forest is continuing a comprehensive process of access and travel management and this year will continue a watershed analysis process that is likely to identify additional roads to be closed or obliterated.

Recommendations Include:

Further Evaluation.

Additional yearly information is needed. Due to the uncertainty about the future, it would be premature to make new assumptions for the purpose of estimating new outputs.

M. INSECT AND DISEASE

Monitoring Item-

INSECT AND DISEASE CONTROL

The goal is to assure that management practices do not contribute to increases in the incidence of destructive insects and diseases, such as western spruce budworm, tussock moth, pine beetles, dwarf mistletoes, root rots, and others. The monitoring question is:

Are destructive insect and disease organisms remaining below potentially damaging levels following management activities?

A survey was conducted during the summer of 1996 by the Forest Insect and Disease (FID) staff of the Pacific Northwest Region in cooperation with the Washington Department of Natural Resources. Copies of the survey maps were given to the Forest and each Ranger District. One publication that was produced and distributed is *Disturbance and Forest Health in Oregon and Washington.*

The survey was conducted from airplanes, and represents current insect conditions across the forested landscapes of the Wenatchee National Forest. The aerial survey, supplemented with other observations indicates:

- Defoliation by western spruce budworm and Douglas-fir tussock moth is at non-detectable levels. Same results reported in 1995.
- Mortality associated with mountain pine beetle appears to be slightly decreasing Forest-wide; one exception is the Entiat Ranger District.
- Western Pine Beetle activity has increased from last year. Chelan, Leavenworth, and Naches Ranger Districts are affected the most. Western pine beetle caused-mortality appears to be increasing in frequency in overstocked pole and small sawtimber size ponderosa pine stands. This insect will continue to pose a high risk for mortality, due to overstocked stands in the dry forest of ponderosa pine, Douglas-fir, and grand fir.
- Blister rust continues to kill Western White and Whitebark pines. It is most common on the Lake Wenatchee and Naches Ranger Districts.
- Fir Engraver activity continues to show decline from the peak in the late 1980's.
- Douglas-fir beetle activity is still low.

- Englemann Spruce beetle activity is still low. The activity is confined to isolated small areas.
- Balsam Woolly Adelgid activity is still low. Tree killing by this insect is mainly confined to Subalpine fir.
- Western Balsam BB activity is still low.

A survey of seed orchards and evaluation plantations was conducted during the summer of 1996. The report is *Insect and Pathogen Survey of National Forest Seed Orchards and Evaluation Plantations in Washington* (USDA Forest Service, 1997). The objective of this study was to determine which insect species, pathogenic organisms, and abiotic agents are affecting trees in seed orchards and evaluation plantations, and provide estimates of the percentage of trees affected by these agents. Survey results are provided by seed orchards/evaluation plantations:

- Camas Creek Seed Orchard - Armillaria root rot has been found killing trees. More than half of the trees are infested with western pine shoot borer (should be monitored).
- North Corner Evaluation Plantation - Frost (lower portion of plantation). Black stain root disease is killing some trees.
- North End Evaluation Plantation.
- Duncan Ridge Seed Orchard - Substantial amount of damage from abiotic agents.
- Duncan Ridge Evaluation Plantation - Several black stain root disease killed trees. Damage from abiotic agents.
- Lone Peak Seed Orchard - Trees appear to be in good condition.
- Mud Creek Seed Orchard - Many trees killed or injured by the 1994 Tyee fire. Western pine shoot borer attacks are common (more monitoring needed).
- Cream Soda Evaluation Plantation - Very brushy. High incidence of needle rust may also be associated with the dense brush.
- Faultline No. 5 Evaluation Plantation - Laminated root rot may be a problem.
- Faultline No. 11 Evaluation Plantation - Armillaria and laminated root rot mortality appears to be a problem.
- Goose Creek Evaluation Plantation - Laminated root rot appears to be a problem.
- Branch Creek Evaluation Plantation - Past thinning activity seems to have cured the problems with cankers and Armillaria root disease.
- Hard Knox Seed Orchard - Surrounding regeneration is infected with White pine blister rust.
- Hurricane Evaluation Plantation - Armillaria root disease may be a problem.
- Silver Meadows Evaluation Plantation - Mechanical damage from abiotic agents was common.

Insect populations and/or infection centers show an increase since the last measurement/survey. Forest-wide (all ownerships), the amount of insect and disease activity seems to be stable to slightly decreasing. No changes are needed in the Forest Monitoring Plan.

Recommendations Include:

Continue monitoring as scheduled; additional study and information is needed before action is taken.

N. FOREST FIRE PROTECTION

Monitoring Item -

FOREST FIRE PROTECTION

The goal is to provide protection from wildfire for Forest users, facilities and Forest resources in an efficient manner. The monitoring questions are:

Are implemented fire suppression strategies adequately protecting the public, facilities and Forest resources?

Are costs of protection in line with those projected by the National Fire Management Analysis System?

The fire season of 1996 was below average in numbers of fires and acres burned, as well as in suppression dollars expended. The Wenatchee National Forest supported fire suppression efforts in other Regions and Forests, beginning in March and continuing throughout the summer. Approximately, 540 personnel participated in fire assignments. Off-Forest assignments were estimated at 2,100 person days.

The first statistical fire of the season occurred on May 26, 1996. Fire activity remained light until the lightning storm of September 13th which produced 13 fires on the North end of the Forest. On September 28th, the 157 acre Myrtle fire started. The area Incident Management Team was mobilized to support the suppression effort.

For the year, the Forest had 88 fires. Lightning accounted for 26 and the remaining 62 were human caused. Total National Forest acres burned equaled 309 acres.

Emphasis was placed on developing and maintaining interagency programs to improve the efficiency of our Fire Management Program. The Forest continued to participate in the Central Washington Interagency Communication Center (CWICC), to staff fire suppression engines, and to develop Incident Management Teams in partnership with the State of Washington Department of Natural Resources and other federal agencies.

The Forest hosted several national fire suppression resources. These included an Interagency Hotshot Crew based at the Entiat Ranger District, a helicopter crew with rappelling capability and a medium helicopter and module based at the Chelan Ranger District. Two large air tankers and one lead plane and pilot were stationed at the Wenatchee Tanker Base at the Pangborn Airport facility.

In 1996, the Forest emphasized safety, both in training and daily work activities. Managers organized for this fire season by providing advanced training and encouraging employees to participate on Type I and Type II Incident Management Teams. All employees available for fire suppression received appropriate initial attack training. Many of these employees attended the Interagency Firefighter training at Camp Chaparral.

In addition to the fire suppression program, we continued to emphasize fire detection and prevention as important components of the Fire Management Program. The number of fires caused by escaped campfires rose to 40 this year and additional prevention actions are warranted.

Recommendations Include:

Continue to monitor the effectiveness of the fire prevention program.

Review criteria for implementing campfire restrictions and closures.

Monitoring Item -

USE OF PRESCRIBED FIRE

The goal is to provide appropriate, efficient application of prescribed fire in support of the Forest Management Program. The monitoring questions are:

Are the acres being treated with prescribed fire meeting expected resource management objectives?

Are Forest fuel loadings exceeding natural levels and therefore placing Forest users, improvements and/or resource values at risk?

The use of fire as a tool to manage unwanted vegetation and debris, and to prepare areas for the planting of new trees, continued to be a significant portion of the work. During FY96, 3,180 acres were treated with prescribed fire.

The Forest has successfully implemented prescribed burns that met resource management objectives and reduced fuel loadings; however, the increased awareness about the dry forest ecosystem which includes fuel loadings and stand densities in excess of historic conditions, has caused the Forest to seek new management techniques which can be applied on a much larger scale than used in the past.

Recommendations Include:

Continue monitoring as scheduled.

The Forest continues to support on-going research supporting fire as an important disturbance process in all dry site ecosystems.

The Forest is currently developing a *dry site strategy* which will allow the managers to implement fuel reduction and vegetation management activities on a large acreage scale that will decrease the possibility of high intensity fires.

O. AIR RESOURCE MANAGEMENT

Monitoring Item-

AIR RESOURCE MANAGEMENT

The goal is to maintain air quality in conjunction with all cooperating agencies. The monitoring questions include:

Are the impacts on air quality being considered in the management activities being proposed?

Is the Forest in compliance with direction outlined in the Clean Air Act, the Washington State Implementation Plan, and National Forest Policy?

The national visibility monitoring program entitled Interagency Monitoring of Protected Visual Environments (IMPROVE) began collecting data on visual air quality for selected Class I areas in 1988. Currently, 67 sites participate in the program across the Country. Program goals are to determine existing visual air quality, identify sources of visibility impairment, and document long-term trends so progress towards the Clean Air Act goal to remedy existing visibility impairment can be tracked.

The Wenatchee and Mt. Baker-Snoqualmie National Forests jointly sponsor an IMPROVE site to monitor visibility in Alpine Lakes Wilderness. The equipment has been located at Snoqualmie Pass and operated by staff from the Cle Elum Ranger District since the summer of 1993. Due to the complexity of the analysis, data results often lag more than a year behind data collection so the trend information is not yet available for the Snoqualmie Pass site. Preliminary results from the site do indicate some of the sources of visibility impairment. Important sources of visibility impairment include sulfates, nitrates, and organics. Sulfates are commonly associated with coal/oil fired power plants, and refining and smelting. Nitrates are generally associated with automobiles and other combustion sources. Organics can be natural emission (biogenic), smoke, or industrial solvents. Less important to

visibility impairment at Snoqualmie Pass are soot (diesel exhaust and smoke), and course particles (dust, smoke, and/or pollen).

The theoretical maximum distance one can see through a clean atmosphere is about 240 miles. With just three quarters of monitoring results currently available, visibility at Snoqualmie Pass ranges from about 67 miles (average of the cleanest 20 percent of days) to 15 miles (average of the dirtiest 20 percent of days). Fifteen miles is fairly typical for the dirtiest days for sites in the Pacific Northwest; but 67 miles as an average of clean days is the poorest among the five IMPROVE sites in the Region.

Recommendations Include:

Continue monitoring as scheduled and Further Evaluation.

Continue to examine future monitoring results to determine if the above trend continues (the poorest among the five IMPROVE sites for clean days).

P. MINERALS

Monitoring Item -

MINING SITE RECLAMATION

The goal is to ensure that disturbed lands are reclaimed to a use consistent with the Rehabilitation Standards and Guidelines.

The monitoring that was completed in 1996 indicates that mining-related activity may have increased slightly from what was reported in the previous years. In summary, it indicates that approximately 71 acres were disturbed by mining-related activities on the Forest. Of this, about 35 acres (50 percent) were satisfactorily reclaimed and met our reclamation objectives. The remaining 50 percent were not reclaimed due to continuing operations, or the operators have been told to bring the reclamation into compliance.

Number Plans of Operations, Notices of Intent, permits, etc: 163
Number and percent monitored: 91 (56 percent)
Number of acres disturbed: 71
Number of acres and percent reclaimed: 34 (48 percent)

Due to the lack of Forest Plan level funding, 100 percent of the reclamation efforts on the Forest were not monitored. Of those that were monitored, about 48 percent had been appropriately reclaimed. It is surmised that the remaining 52 percent have not been reclaimed because the operation is continuing, or it has not been appropriately monitored due to the lack of funding. Adequate reclamation will either be conducted or reclamation bonds will be used to bring the reclamation up to

Standard. It is assumed that similar results would be found on those operations that were not monitored.

Recommendations Include:

The major problem with appropriate monitoring is not the process, but the available funding and staff. Request Forest Plan level funding that will allow 100 percent monitoring of all mineral related activities

If funding is provided then conduct additional monitoring to ensure adequate reclamation is being completed. Where it isn't being properly completed, take regulatory action to require the operator to do the required reclamation or use the bonds to do the work ourselves.

Complete the inventory and evaluation of abandoned mine sites, and request funding to do the necessary clean-up and reclamation work.

The budget and organization were inadequate to allow monitoring at a 100 percent level, and until it is adequate the monitoring evaluation will not be conclusive. The objectives in the Plan appear to be adequate, and performance bonds and regulatory authority provide for compliance when that is not being achieved.

Monitoring Item -

MINING OPERATING PLANS

The goal is to ensure that mining plans of operations and notices of intent to operate are processed in a timely manner and administered complying with Regulations and with Forest Management Goals and Management Area Standards and Guidelines.

Approximately 136 Plans of Operations and Notices of Intent were processed this year. Of these, only 57 percent of the total number of operations were monitored. Based upon the monitoring that was done, it is estimated that approximately 71 acres were disturbed with 50 percent of that being adequately reclaimed. Eighty-six percent of those activities monitored were adequately meeting the objectives of the Forest Plan.

Number of Plans of Operations and Notices of Intent: 136

Number and percent monitored: 77 (57 percent)

Number and percent in compliance: 66 (86 percent)

Due to the lack of Forest Plan level of funding, lack of available personnel and other priorities, monitoring could not be done on 100 percent of the operations.

As a consequence, the actual percentage of operations meeting our objectives is not known. This will continue until funding is increased to the Forest Plan level. It is assumed that monitoring is being done on the larger, more environmentally sensitive operations; and similar results would be found on those operations that were not monitored.

Recommendations Include:

Continue monitoring as scheduled; based upon the monitoring that was completed, a Forest Plan adjustment is not necessary at this time.

Pro-actively conduct programmatic resource surveys that will accommodate anticipated mineral activity and other similar resource activities. This will allow the processing of plans of operation in a more timely and efficient manner.

As indicated above, the major problem with processing and monitoring operating plans is not the process, but the available funding and staff.

Based upon the monitoring that was completed, a Forest Plan adjustment is not necessary at this time. An adjustment for mining in Riparian areas is being considered, however, it may be done along with the Forest Plan revision.

The objectives and Standards and Guidelines in the Plan appear to be adequate, but the level of funding is inadequate to ensure 100 percent compliance.

Q. COMMUNITY EFFECTS AND RESOURCE BUDGETS

Monitoring Item -

Community Effects

The goal is to provide local communities with a constant source of opportunity for the use of goods and services that provide for desired community growth. The Wenatchee National Forest Impact Area includes Chelan, Douglas, Kittitas, and Yakima Counties. The monitoring questions are:

Are payments to counties changing?

Are local populations changing?

Are local employment patterns changing?

Are lifestyles, attitudes, beliefs, or values changing?

Are Forest contributions to area forest products industries changing?

Changes in Payments to Counties

By law, 25 percent of the revenues collected by the Forest Service from the use of National Forest system lands and resources are returned to the counties as a source of funds for schools and roads. In Washington State, half of the funds (school portion) are redistributed throughout the State, while the road portion remains within the county.

Historically, the majority of the receipts have been generated by timber sales. Because of the sharp reduction in timber sales on public lands, the receipts have declined dramatically; however, timber sales still provide the majority of receipts. Special use recreation permit fees for ski areas and recreation residences have increased over the past 5 years due to re-appraisals of fair market value. Recreation fees for campgrounds have declined over the past 5 years as more Forest Service campgrounds have been converted to concessionaire operations.

In 1993, Congress passed Section 315 of the Interior and Related Agencies 1993 Appropriations Act which was designed to mitigate the economic effects associated with the listing of the northern spotted owl. For FY 1995 the Forest Service paid the states and counties affected by the listing of northern spotted owl at a rate equal to 82 percent of the 5 year (1986-1990) average. This owl guarantee payment will continue to decline 3 percent each year into the next decade.

Area	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
Chelan Co.	2,144,756.14	2,061,905.09	1,948,905.09	1,948,376.20	1,884,349.37
Douglas Co.	2.99	2.86	2.70	2.70	2.61
Kittitas Co.	885,707.05	790,851.86	731,547.75	731,499.24	707,795.97
Yakima Co.	3,351,123.98	2,674,761.01	2,406,458.57	2,405,790.68	2,317,723.14
Total	6,392,590.16	5,527,520.62	5,086,335.28	5,085,688.82	4,909,871.09

Without the owl guarantee payment the payments to counties would have been as follows: (1) Chelan County, $756,662.75, (2) Douglas County, $1.04, (3) Kittitas County, $223,449.39, and (4) Yakima County, $329,401.61.

The 1990 Forest Plan predicted county revenues of $5,085,300 per year. The payments to the counties are well within this threshold. The Northwest Forest Plan predicted county revenues of approximately $1,800,000 for the Wenatchee Impact Area Counties. This is less than actual receipts of $1,309,514.80. Legislation passed by Congress has resulted in a much higher payment to the impacted counties.

Change in Local Population

The population continues to increase within the Counties influenced by the Wenatchee National Forest. According to the State of Washington Office of Financial Management, growth rates in eastern Washington have dropped below rates in western Washington. The growth rate for Chelan, Douglas, Kittitas, and Yakima Counties continues to be above the State average and rates for western Washington. For Chelan, Douglas, and Kittitas Counties, the population increase is due to migration primarily from the Puget Sound. Yakima County's growth is due to births rather than in-migration. Kittitas County growth appears to be driven by people who still work in the Puget Sound area, but have changed their primary residence to Kittitas County.

Economic conditions improved in western Washington during 1995, which should lead to lower migration rates to the eastern slope counties. For 1995, population growth continued even though employment growth was negative in Chelan and Yakima Counties. Douglas County showed a slight increase, while Kittitas County was the only County showing substantial employment growth at 7.8 percent. The downturn in employment, if it continued in 1996, should lead to population declines, or a dramatic slowing in population growth for these Counties.

Percent Annual Population Growth Rates

Area	1991	1992	1993	1994	1995	1996	1990-1995
Chelan Co.	1.82%	2.63%	2.56%	3.57%	3.45%	2.17%	17.32%
Douglas Co.	4.94%	1.45%	2.15%	2.81%	1.02%	2.70%	20.61%
Kittitas Co.	2.53%	1.46%	5.04%	1.71%	1.35%	2.33%	15.25%
Yakima Co.	0.89%	1.78%	1.60%	2.59%	0.99%	1.71%	9.94%
Impact Area	1.55%	1.86%	2.12%	2.69%	1.46%	1.95%	12.66%
WA State	2.75%	2.33%	2.43%	1.78%	1.79%	1.60%	13.36%
King County	2.32%	1.44%	1.48%	0.74%	0.88%	.94%	8.06%

Estimated Total Population 1990-1995

Area	1990	1991	1992	1993	1994	1995	1996
Chelan Co.	52,250	53,200	54,600	56,000	58,000	60,000	61,300
Douglas Co.	26,205	27,500	27,900	28,500	29,300	29,600	30,400
Kittitas Co.	26,725	27,400	27,800	29,200	29,700	30,100	30,800
Yakima Co.	188,823	190,500	193,900	197,000	202,100	204,100	207,600
Impact Area	295,993	300,591	306,192	312,693	321,094	325,795	330,100
WA State	4,866,663	5,000,371	5,116,671	5,240900	5,334,400	5,429,900	5,516,800
King Co.	1,507,305	1,542,286	1,564,486	1,587,700	1,599,500	1,613,600	1,628,800

Components of Population Increase, 1990-1995

Area	Total Increase	Natural Increase	Natural Increase as % of Total	Net Migration	Net Migration as % of Total
Chelan Co.	9,050	2,544	28%	6,506	72%
Douglas Co.	4,195	1,428	34%	2,767	66%
Kittitas Co.	4,075	565	14%	3,510	86%
Yakima Co.	18,777	15,613	83%	3,164	17%
WA State	650,137	237,765	37%	412,372	63%
King Co.	121,495	68,452	56%	53,043	44%

Changes in Local Employment Patterns

The State of Washington Employment Security Reports for Employment and Wages are published on a one-year delay. The employment data for 1995 is the most recent available.

In 1995, the economy in the Wenatchee Impact Area actually contracted at a negative 0.3 percent. This compares with a growth rate of 1.6 percent for Washington State. This is a significant change from 1990 through 1994, when the local economy grew significantly faster than the State economy.

Total Covered Employment

Area	1990	1991	1992	1993	1994	1995	%Change 94-95	%Change 90-95
Chelan Co.	29,757	30,296	30,655	32,166	34,479	33,777	-2.0%	13.5%
Douglas Co.	8,334	8,303	8,091	7,950	8,379	8,538	+1.9%	2.4%
Kittitas Co.	9,147	9,249	9,538	10,270	10,772	11,616	+7.8%	27.0%
Yakima Co.	82,706	81,466	85,919	87,867	90,022	89,354	-0.7%	8.0%
Impact Area	129,944	129,314	134,203	138,253	143,652	143,285	-0.3%	10.3%
WA State	2,144,370	2,160,883	2,205,665	2,248,245	2,303,539	2,339,727	+1.6%	9.1%

From 1990 through 1994, employment grew faster than the State average for the Wenatchee Impact Area.

Percent Change in Covered Employment by Sector from 1990 to 1995

Sector	Wenatchee Impact Area		State of Washington	
	1990-1995	1994-1995	1990-1995	1994-1995
Agriculture, Forestry, & Fish	-3.78%	-5.88%	3.63%	-1.92%
Mining and Construction	22.96%	-8.56%	1.70%	-1.77%
Manufacturing	1.55%	-2.67%	-10.50%	-1.57%
Transportation & Public Utilities	17.30%	18.51%	7.28%	3.04%
Wholesale Trade	17.54%	0.68%	11.04%	3.73%
Retail Trade	12.96%	1.24%	11.30%	2.92%
Finance, Insurance, & Real Estate	13.73%	-2.01%	4.48%	-2.61%
Services	20.16%	3.32%	23.71%	3.69%
Government	17.17%	1.71%	12.42%	1.71%
Total	10.27%	-0.26%	9.11%	1.57%

The major economic sectors in the area are agriculture, retail trade, services, and government. Agriculture is the largest sector, but indicative of change it decrease in employment by -3.78 percent from 1990 through 1995. In 1995, agriculture decreased -5.88 percent. Almost all major sectors grew more slowly or declined more rapidly in 1995, compared to the State. Mining and construction showed the greatest decline at -8.56 percent. This resulted from the Cannon Mine closure in Wenatchee, and the overbuilding of housing stock during the boom years of the early 1990's.

Average Annual Wages Paid per Job by Covered Employment by Year (1995 base year)

Area	1990	1991	1992	1993	1994	1995
Chelan Co.	18,552	19,683	19,448	19,403	19,413	19,885
Douglas Co.	14,618	15,293	15,808	15,944	15,880	16,329
Kittitas Co.	18,416	18,365	18,517	18,322	18,183	17,440
Yakima Co.	17,603	17,987	17,948	18,485	18,851	19,195
Impact Area	17,686	18,238	18,411	18,540	18,763	19,044
WA State				26,744	26,860	27,446

Average real wages continued to increase in the area, with the exception of Kittitas County. Continued strong in-migration in Kittitas County increases the supply of workers, therefore reducing the wages employers need to pay.

The Lumber and Wood Products Manufacturing, Paper and Allied Products, Manufacturing, Eating and Drinking Establishments in the Retail Trade Sector, and Hotel and Other Lodging Places in the Service Sector are industries directly affected by Forest Service activities. The growth and changes in the economy in this area have made these sectors less dependent on the Forest Service.

The development of Yakima and Wenatchee as convention centers and weekend destinations for Puget Sound residents has lead to a tourism industry based on sunny and warm weather. The development of urban parks, golf courses, and other tourist facilities is attracting visitors that only drive through National Forest lands. Other communities like Cle Elum, Leavenworth, Lake Wenatchee, and Chelan all attract visitors in which National Forest lands are primary or important reasons for visiting these areas.

The substantial reduction in timber harvest levels on federal lands has been mitigated to a certain extent by increased timber harvest from small landowners. This was in response to high prices brought on by lumber shortages in the early 1990's. The following tables show employment and wages for those economic sectors directly affected by Forest Service activities.

Covered Employment: Manufacturing - Lumber and Wood Products

Area	1990	1991	1992	1993	1994	1995	% Change 90-95
Chelan Co.	236	172	208	202	208	203	-14.0%
Douglas Co.	0	0	0	0	0	0	n/a
Kittitas Co.	170	169	156	161	145	146	-14.1%
Yakima Co.	1,490	1,593	1,677	1,726	1,884	1,704	14.4%
Impact Area	1,896	1,934	2,041	2,089	2,237	2,053	8.3%

Covered Employment: Manufacturing - Paper and Allied Products

Area	1990	1991	1992	1993	1994	1995	% Change 90-94
Chelan Co.	0	0	0	0	0	0	n/a
Douglas Co.	0	0	0	0	0	0	n/a
Kittitas Co.	0	0	0	0	0	0	n/a
Yakima Co.	862	692	707	684	677	708	-17.9%
Impact Area	862	692	707	684	677	708	-17.9%

Covered Employment: Retail Trade - Eating and Drinking Places

Area	1990	1991	1992	1993	1994	1995	% Change 90-95
Chelan Co.	1,786	1,858	2,098	2,163	2,212	2,187	22.5%
Douglas Co.	490	464	478	508	551	559	14.1%
Kittitas Co.	1,104	1,122	1,189	1,250	1,447	1,394	26.3%
Yakima Co.	4,039	4,018	4,309	4,374	4,405	4,427	9.6%
Impact Area	7,419	7,462	8,074	8,295	8,615	8,567	15.5%

Covered Employment: Services - Hotels and Lodging Places

Area	1990	1991	1992	1993	1994	1995	% Change 90-95
Chelan Co.	872	881	852	868	857	889	1.9%
Douglas Co.	0	0	0	0	0	126	100%
Kittitas Co.	1,410	1,736	1,750	1,891	1,901	1,891	34.1%
Yakima Co.	846	671	635	584	614	661	-21.9%
Impact Area	1,936	1,808	1,723	1,698	1,688	1,764	-8.9%

Covered Employment: Services - Amusement and Recreation Services

Area	1990	1991	1992	1993	1994	1995	% Change 90-94
Chelan Co.	452	504	328	364	397	400	-11.5%
Douglas Co.	80	65	81	105	116	125	56.3%
Kittitas Co.	516	372	362	260	351	590	14.3%
Yakima Co.	836	829	815	942	1,016	977	16.9%
Impact Area	1884	1770	1586	1671	1880	2,092	11.0%

Average Real Wages: Manufacturing - Lumber and Wood Products

Area	1990	1991	1992	1993	1994	1995	% Change 90-94
Chelan Co.	22,303	19,954	20,580	22,606	22,658	23,911	7.2%
Douglas Co.	0	0	0	0	0	0	0.0%
Kittitas Co.	25,825	24,874	25,601	22,910	21,265	22,664	-12.2%
Yakima Co.	26,270	25,494	25,886	24,7775	25,143	26,119	-0.6%
Impact Area	25,736	24,947	25,323	24,422	24,661	25,655	-0.3%

Average Real Wages: Manufacturing - Paper and Allied Products

Area	1990	1991	1992	1993	1994	1995	% Change 90-95
Chelan Co.	0	0	0	0	0	0	0.0%
Douglas Co.	0	0	0	0	0	0	0.0%
Kittitas Co.	0	0	0	0	0	0	0.0%
Yakima Co.	34,206	31,081	31,305	31,559	32,625	33,537	-2.0%
Impact Area	34,206	31,081	31,305	31,559	32,625	33,537	-2.0%

Average Real Wages: Retail Trade - Eating and Drinking Places

Area	1990	1991	1992	1993	1994	1995	% Change 90-95
Chelan Co.	7,710	7,729	8,004	8,145	8,492	8,815	14.3%
Douglas Co.	6,783	6,725	7,472	7,709	7,684	7,937	17.0%
Kittitas Co.	8,091	7,891	7,986	7,898	7,908	7,943	-1.8%
Yakima Co.	7,475	7,847	7,913	8,387	8,265	8,447	13.0%
Impact Area	7,578	7,754	7922	8,209	8,226	8,426	11.2%

Average Real Wages: Services - Hotels and Lodging Places

Area	1990	1991	1992	1993	1994	1995	% Change 90-95
Chelan Co.	9,272	9,620	9,384	9,657	9,786	9,730	4.9%
Douglas Co.	0	0	0	0	0	0	0.0%
Kittitas Co.	7,393	7,412	7,882	7,987	8,927	8,836	19.5%
Yakima Co.	9,394	9,852	9,001	9,586	10,115	9,850	4.9%
Impact Area	9,114	9,393	9,037	9,391	9,795	9,667	6.1%

Average Real Wages: Services - Amusement and Recreation Services

Area	1990	1991	1992	1993	1994	1995	% Change 90-94
Chelan Co.	9,723	9,913	9,071	9,191	9,451	10,205	5.0%
Douglas Co.	11,087	11,199	11,837	13,279	13,150	12,816	15.6%
Kittitas Co.	5,726	6,182	5,844	4,200	6,111	6,605	15.4%
Yakima Co.	8,942	9,879	11,337	10,321	10,761	11,462	28.2%
Impact Area	8,340	9,160	9,640	9,308	9,763	9,933	19.1%

Change in Lifestyles, Attitudes, Beliefs, or Values

The first decade of the 1990's was characterized by heavy urban migration to rural areas. This migration was particularly heavy in those areas with outdoor recreation opportunities. In Kittitas County, there has been an influx of residents that have continued to work in the Puget Sound area. It is highly likely that within the next 10 to 20 years, Kittitas County will become a bedroom community of the Seattle area.

The slow economic growth in the urban areas during the early 1990's resulted in downsizing, early retirements, and layoffs. This has fueled population growth and economic growth in areas like eastern Washington. There are indications that his trend has been reversing in the past 2 years. Economic growth has been higher in Puget Sound than eastern Washington. This could lead to migration back to urban areas as people seek employment opportunities. At this time, the eastern slope Counties show increasing populations, while employment is flat to declining, with the exception of Kittitas County. This could indicate an economy in transition to slow or negative growth.

A study by Montana State University showed that only 10 percent of urban transplants remained in Montana after 10 years. Lack of employment opportunities and problems adapting to rural lifestyles lead to most of these individuals moving back to the cities. There is some evidence of this in Chelan and Douglas Counties, which were popular areas for urban transplants. This movement could be offset by an increase in retirees coming to the area. The increased population and declining employment data suggests that this could be a possibility.

The area is changing; becoming more urban in lifestyles, attitudes, beliefs, and values. These changes are driven by national trends and outside the scope of the Forest Service Programs.

Changes in Forest Contribution to Forest Products Industry

The following table shows the volume harvested on Forest Service managed lands and the volume offered for sale.

Fiscal Year	Volume Offered	Volume Harvested
1990	227	173
1991	15.4	136
1992	22.9	94
1993	16.8	58
1994	12	33
1995	98.8	18
1996	92.5	91.7

The volume sold in 1990 reflects the requirements of Section 318 of the Federal Budget Act. The significant drop in volume sold in 1991 is the result of court and agency decisions on the management of the northern spotted owl habitat. Volume offered continued to drop through 1994 in response to court and agency decisions on the management of northern spotted owl habitat and the development and adoption of the Northwest Forest Plan. The volume offered in FY 1995 and FY 1996 reflects the salvage volume offered after the wildfires of 1994.

Monitoring Item -

Resource Budgets

The goal is to provide funding levels necessary to achieve outputs in the Forest Plan. The monitoring question is:

Are the budgets received adequate for achieving the objectives described an projected in the Forest Plan?

The following table reflects the program budgets on the Wenatchee National Forest since 1990. The budget request for 1993 represents the first budget that was developed using the Forest Plan. The definitions of program areas change from Fiscal Year 1991 to Fiscal Year 1996 and this reflects some of the changes in funding for individual program areas.

Program Area	Fiscal Year 1991	Fiscal Year 1992	Fiscal Year 1993	Fiscal Year 1994	Fiscal Year 1995	Fiscal Year 1996
Recreation	3,027,000	3,739,000	4,535,035	3,428,690	2,577,795	2,250,240
Fisheries	520,000	956,000	1,381,889	761,487	485,205	500,151
Threatened & Endangered Species	244,000	255,000	175,908	317,008	170,437	174,726
Wildlife	244,000	279,000	156,329	206,614	436,327	486,087
Range	198,000	149,000	276,630	254,533	324,608	212,983
Timber	7,944,000	7,096,000	5,423,457	5,420,986	8,612,462	7,817,329
Other Resource Support to Timber	973,000	1,326,000	1,077,171	709,364		
Watershed & Air	1,772,000	1,075,000	885,223	2,938,457	581,286	601,236
Minerals & Geology	188,000	161,000	240,104	203,359	327,398	290,070
Lands	1,257,000	4,347,000	4,328,440	901,096	4,006,100	366,543
Facilities & Transportation	5,005,000	6,200,000	3,999,503	3,854,485	3,192,169	2,683,177
Protection, State & Private Forestry	3,357,000	5,692,000	3,339,958	11,774,526*	11,762,625*	4,360,732
General Administration	2,691,000	4,372,000	2,419,543	2,332,846	2,449,668	2,125,070
Overhead Assessments	3,111,000	3,321,000	2,764,588	2,991,427	3,264,416	3,160,177
TOTAL EXPENDITURES	30,531,000	38,968,000	31,063,778	36,094,878	39,809,950	26,117,162

* FY 94 figure includes $7.8 million for emergency fire recovery. FY 95 figure includes $7.7 million for emergency fire recovery.

The budgets reflect emergency federal action and shifts in Congressional funding. For example, the large expenditure in Watershed and Air in 1990 reflects the cleanup and rehabilitation after the floods of 1990. The FY 1994 and FY 1995 budgets reflect emergency fire recovery funds as a result of the 1994 fires.

The following table represents the Wenatchee National Forest's budget requests to implement the Forest Plan. The budget request do not include emergency flood and fire funds. The 1993 budget request is the first to be directly linked to the Forest Plan. Beginning in 1993, the Forest no longer completes outyear budget requests. The budget request for 1997 was completed by the Regional Office.

Program Area	1993 Budget Requests	1994 Budget Requests	1995 Budget Requests	1996 Budget Requests
Recreation	6,371,000	6,421,000	7,082,000	5,073,000
Fisheries	612,000	527,000	1,268,000	1,483,000
Threatened & Endangered Species	858,000	797,000	1,349,000	1,668,000
Wildlife	749,000	668,000	1,132,000	1,453,000
Range	412,000	415,000	1,164,000	1,317,000
Timber	8,684,000	6,051,000	5,812,000	7,261,000
Other Resource Support to Timber	1,363,000	612,000	1,251,000	
Watershed & Air	3,738,000	790,000	1,226,000	1,682,000
Minerals & Geology	398,000	698,000	566,000	1,373,000
Lands	986,000	708,000	1,000,000	1,449,000
Facilities & Transportation	9,121,000	6,652,000	6,990,000	5,970,000
Protection, State & Private Forestry	3,436,000	4,204,000	5,859,000	5,501,000
General Administration	3,832,000	3,180,000	3,180,000	1,904,000
Overhead Assessments	4,489,000	4,218,000	3,870,000	3,480,000
TOTAL REQUESTS	42,049,000	35,641,000	41,749,000	41,290,000

Recommendations Include:

No additional action is necessary except to continue monitoring as scheduled.

R. GENERAL MONITORING OF STANDARDS & GUIDELINES

Monitoring Item-

STANDARD AND GUIDELINES GENERAL

The goal is to ensure implementation and validation of Forest Plan Standards and Guidelines. Monitoring seeks to assure Forest goals, outputs, and the desired future condition. The monitoring questions are:

Are Forest Plan Standards and Guidelines being implemented?

Are implemented Standards and Guidelines achieving the expected results?

Proposed projects are reviewed for consistency with Forest Plan Standards and Guidelines during the National Environmental Policy Act process. After the signing of the Northwest Forest Plan, training sessions were held in Yakima and Leavenworth to ensure that Forest employees understood the rationale and Standards and Guidelines within the Plan. These training sessions and reviews are done on a continuing basis.

The Northwest Forest Plan established an interagency monitoring program on implementation monitoring. The procedures were developed in FY 1995 and a test implementation was conducted in FY 1996. A sample of projects were monitored. The interagency team found that the projects were generally consistent with the Standards and Guidelines in the Northwest Forest Plan. Copies of this report, "Results of the FY 1996 (Pilot Year) Implementation Monitoring Program," are available from the Wenatchee national Forest or the Regional Ecosystem Office in Portland.

Recommendations Include:

Continue monitoring as scheduled.

V. FOREST PLANNING UPDATE

A. FOREST PLAN APPEALS

The one remaining appeal of the 1990 Wenatchee Forest Plan by the Columbia River Intertribal Fish Commission (CRITFC) was resolved on May 20, 1996, through a decision issued by Sterling Wilcox, Reviewing Officer for former U.S. Forest Service Chief Jack Ward Thomas. Although the original CRITFC appeal was directed to the 1990 Plan, it was evaluated in the final appeal decision against the Wenatchee Forest Plan, as amended by the 1994 Northwest Forest Plan, since any relief granted would affect the Plan as it currently exists. The Reviewing Officer's decision determined that the 1994 amendment to the Forest Plan provided much of the relief requested by the appellant, and that no further relief was warranted. Accordingly, the Regional Forester's original Wenatchee National Forest Plan decision was affirmed.

An important finding in the Reviewing Officer's decision was the point that National Forest planning is an ongoing process. Monitoring, evaluation, amendments and revisions help to keep Forest Plans responsive and dynamic, by taking into account progress in science and technology, discovery of new relationships, and new information about natural environments. This process allows for the continued participation of the public in the incorporation of new information and in any necessary modification of existing Forest Plans.

B. FOREST PLAN LITIGATION

The last of the Forest Plan-related lawsuits was dismissed in February 1996. In Sierra Club and Washington Wilderness Coalition v. Jack Ward Thomas the plaintiffs filed a complaint in the Western District Court of Washington on the basis that the Forest Service had not issued a final ruling on the merits of their 1990 administrative appeal of the land and resource management plans for the Wenatchee, Okanogan and Mount Baker-Snoqualmie National Forests. This suit was a follow-up to an earlier Sierra Club v. Butruille case (1992) and sought a final determination of all administrative appeal issues that had been deferred by the Chief. This case was dismissed by Judge Thomas Zilly in February 1996, as a result of the Chief's December 1995 issuance of the final decisions on the Sierra Club Forest Plan appeals.

C. FOREST PLAN AMENDMENTS

There were four amendments to the Wenatchee Forest Plan in 1996. Three amendments assigned land allocations to the acquired lands; Forest Plan allocations were extended to incorporate the acquired lands. One amendment was to authorize grazing outside of an existing allotment.

Summary of Current Research Efforts

The following projects were accomplished in a cooperative effort between the Wenatchee and Okanogan National Forests, and the Forestry Sciences Lab.

The *Structure of Northern Spotted Owl Nest Stands and their Historical Conditions on the Eastern Slopes of the Pacific Northwest Cascades* was written and published in the Journal of Forest Ecology and Management. This paper shows that spotted owls are nesting in a variety of different stand types, and that these stands have changed dramatically over the last 80 years due to fire suppression. The variability of nest stands allows more flexibility in forest management.

The historic fire regimes in the Ponderosa Pine/Douglas-Fir habitats were analyzed on the Entiat Ranger District (30,000 acres) and the Naches Ranger District (8,000 acres). The results show that historic (1700 to 1900) fires were *frequent* (6 to 9 years) and of *low intensity*, and that *large* fires occurred. Most of these historic fires burned both the riparian and the upslope areas. Information on disturbance regimes provides a guide for sustainable yield of forest products and forest health.

Following the large wildfires in 1994, snag and log management became an issue. Sampling was completed on 22 different burn areas ranging in age from 1 to 81 years, to determine cavity use and snag longevity by species and size. This data has been analyzed and is currently being written. The results show that thick bark species break off and stand for many decades, while thin bark species fall soon and fall tree length. This defines which wood (biomass) can be harvested, and those amounts that can be left as a future legacy without causing a fuel hazard.

We are also collecting data on the historic fire regimes and historic snag/log levels in spotted owl *neighborhoods*. Each neighborhood consists of 1,200 acres centered on the nest tree. Two of these neighborhoods were completed in 1996. The analysis of the fire scar data shows that these areas burned on an average of every 13 years, and that current stand structure may not be in synchrony with their inherent disturbance regimes.

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